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REPORT

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Analysis of Tactical Intelligence Experience in Southeast Asia (U)

by

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This report assesses US tactical intelligence systems effectiveness in Southeast Asia during the period of US involvement in combat. Tactical intelligence needs are analyzed in relation to their satisfaction; different collection means are evaluated in terms of their usefulness in different operational situations; and the utilization of intelligence resources is assessed in the context of needs versus means available to meet specific operational requirements.

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19.

HUMINT	STEEL TIGER	Central Europe
SIGINT	War Zone C	Middle East
SENSORS	conflict environment	lessons

20.

Problems of Intelligence Organization and Management are analyzed and assessed in depth, and the total experience is compared and contrasted with known and/or projected conflict environmental factors in Central Europe and the Middle East. The analysis focuses on tactical echelons responsible for the prosecution of the war on the ground and in the air. Three types of operations are studied in-depth and are treated in separate appendices: viz, Main Force operations in War Zone C; Pacification operations in the Upper Delta; and Air Interdiction operations in the Laotian panhandle. A fourth appendix surveys the principal SENSOR and HUMINT collection systems employed in Southeast Asia.

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The preparation of this revised edition required extra effort by three individuals who are especially well-qualified to advise the authors on matters of fact and on the proper interpretation of critical events. These individuals are: Lieutenant General Julian J. Ewell, Lieutenant General William E. Potts, and Major General Rockly Triantafellu. The authors thank them for their invaluable assistance. The authors also wish to thank Lieutenant General Eugene F. Tighe who, as the PACOM J-2, offered many helpful suggestions in briefing discussions concerning the scope of the investigation, the location of supporting data, and the relative importance of key issues.

CONTENTS

SUMMARY (U)

OBJECTIVE AND KEY ISSUES

(U) The objective of this study is to examine US tactical intelligence experience during the period of US combat operations in Southeast Asia with a view to assessing the effectiveness of tactical intelligence systems and collection techniques employed and identifying the lessons from that experience of potential value in tactical intelligence planning and preparedness for future conflict situations.

(U) Specifically, the study inquires into the following questions which were considered key issues in the course of the analysis:

- What were the key tactical intelligence needs in Southeast Asia; how did they vary with different types of combat and security operations?
- How well were tactical intelligence needs satisfied?
- What tactical intelligence collection means were employed in Southeast Asia; what was their relative effectiveness in relation to different operational requirements and environments?
- How well were tactical intelligence resources utilized in the context of needs versus means available to meet specific operational requirements; what organizational and management problems were encountered and how well were they solved?

- Based on an initial analysis, what is the applicability of the lessons from US tactical intelligence experience in Southeast Asia to future conflict situations in which the United States may become involved?

(U) These questions were examined in relation to the mission objectives of tactical commanders responsible for the prosecution of the war on the ground and in the air.

BACKGROUND

(U) Military operations in Southeast Asia presented US forces with a new enemy, new combat conditions, and a new combat environment. With regard to the latter, Southeast Asia offered an extremely variable and difficult terrain for operations by conventional military forces. The nature of the enemy and the tactics he employed posed perhaps an even more difficult challenge to US forces. Enemy insurgent forces, operating in maneuver units varying in size from battalion and regimental main force units based in remote and generally inaccessible safe haven areas to small guerrilla bands operating among the populated areas of the rice-farming lowlands, presented an elusive target. Using cover and concealment to avoid detection and classic guerrilla raid tactics, the enemy attacked government forces and outposts at the time and place of essentially his own choosing. Defensive tactics, on the other hand, were based on evasion and avoidance of contact with government forces when the latter were superior in numbers and firepower. Given the nature of the enemy, his capabilities and his tactics, the ability to acquire good intelligence and react to it quickly became the key to effective counterinsurgency operations.

(U) US combat activities in Southeast Asia spanned the gamut from unconventional warfare to multi-division operations and included riverine operations, airmobile operations, coastal surveillance, tactical and strategic air interdiction of enemy lines of communications, and attacks against enemy bases and "sanctuaries" in countries neighboring South Vietnam. As US forces succeeded in defeating enemy main force units, the US effort turned increasingly to area security and control/pacification operations in areas traditionally contested by or newly wrested from insurgent forces. In all of these mission assignments, the day-to-day operations of US combat units were vitally affected by (in some cases, literally dictated by) the adequacy of the intelligence available, its perishability and the need to collect additional timely intelligence.

(U) The US involvement in the Southeast Asia conflict also brought major innovations in tactical operations and the introduction of new equipment based on the latest technology. In the intelligence area, these included new surveillance and reconnaissance equipment utilizing airborne infrared, chemical and radar sensors, a variety of night vision aids and devices, signal intelligence equipment, unattended ground sensors, and ground surveillance radars. Despite these efforts, it has been widely alleged by former tactical commanders in Southeast Asia that tactical intelligence collection, evaluation, and dissemination were inadequate in meeting the planning and combat operational needs of tactical units. This criticism has been directed equally against the efficiency of the tactical intelligence systems as a whole and against specific subsystem elements oriented toward supporting the range of US combat mission assignments.

STUDY APPROACH

(U) The approach used in the study involved three separate but inter-related research efforts: a review of official reports, histories, special studies and other available documentation relating to US combat operations in Southeast Asia, with special emphasis on the intelligence aspects of these operations; an examination in-depth of selected types of US combat operations representing different intelligence requirements; and a questionnaire/interview program focused on the direct experience of former tactical commanders and planners of operations against enemy forces.

(U) Documentary sources consulted in the course of the research included special reports and analyses prepared by both defense agencies and contract research organizations, official histories dealing with aspects of the US operational experience in Southeast Asia, After Action Reports, Lessons Learned Reports, Senior Office Debriefing Reports, and selected historical files of DOD staff agencies.

(U) An important part of the data collection effort related to the compilation of basic descriptive data on the variety of tactical intelligence collection means employed in Southeast Asia. They are broadly categorized in this study as SENSOR, SIGINT, and HUMINT, and are evaluated under those headings.

- SENSOR systems included unattended ground sensors (UGS), airborne and ground-based radars, infrared, electro-optical devices, condensation nuclei detectors (people sniffers), and standard photography.

- SIGINT systems included ground and airborne direction-finding (DF), communications intelligence (COMINT), and electronic intelligence (ELINT) systems.

- HUMINT collection means employed to meet tactical requirements were essentially ground reconnaissance patrols, agents, prisoner and rallier interrogations, captured document translations, visual aerial reconnaissance (including Forward Air Controller operations), and non-combatant indigenous personnel who volunteered information about the enemy.

(U) These systems are described in considerable detail in Appendix D of this report.

(U) To reduce the data collection and analysis tasks to manageable proportions and to focus the investigation, the study team chose to concentrate on three selected aspects of the US operational experience in Southeast Asia which, it was felt, would provide a representative cross-section of critical intelligence problems and needs. The operations chosen were;

- Operations against enemy main force units in War Zone C. Included among these were Operations Attleboro (1966), Junction City (1967), and Yellowstone and Saratoga (1967-1968).

- Area security and control (Pacification) operations in the Upper Delta (1966-69). These operations included both joint and combined US Army/US Navy and RVNAF (South Vietnamese Armed Forces) riverine operations in the Upper Delta provinces.

- Air interdiction operations in the Laotian panhandle (1968-72). These included the air interdiction campaigns known as Commando Hunt (I, III, V, and VII).

(U) The results of these analyses are provided in the form of "case studies" contained in Appendixes A, B, and C to this report.

(U) Finally, as a basic supplement to the documentary sources and case study investigations employed in the analysis, an interview program was conducted with approximately sixty officers whose experience in Southeast Asia made them especially knowledgeable of the intelligence needs of US combat forces during the entire period of that conflict. The interviews, which took the form of extended debriefings, served to refine and validate the analysis and findings developed from documentary materials and the specific case study investigations and provided data otherwise not available. The interview program was in turn supplemented by a questionnaire specifically designed to elicit the views and opinions of senior officers on key tactical intelligence issues posed at the outset of the research effort. Some seventy questionnaire responses were received and analyzed. This body of data, though only a limited sample of Southeast Asia experience, provided a basis for presentation of quantitative measures in intelligence systems performance in Southeast Asia as well as additional important insights into the nature of the intelligence problems encountered. The results of these analyses are discussed in Chapters 2 and 3 of this report, and are summarily depicted in a series of tables and charts which address such questions as: (1) the rank order importance of various tactical intelligence needs for the different types of operations studied; (2) the degree to which these needs were satisfied, and (3) the usefulness of different means in satisfying operational needs.

(U) In addition to the above, the study effort covered two other areas of inquiry. The first of these related to the organizational and management problems encountered in conducting tactical intelligence operations in Southeast Asia. The second dealt with the implications of the Southeast Asia tactical intelligence experience for possible tactical operations in future conflict situations in other overseas areas.

Chapter 4 reviews the major features of the organization for tactical intelligence collection, analysis, and dissemination as it evolved in Southeast Asia and discusses such problems as were rooted in the US and allied organizations for the war, in security requirements associated with special intelligence subsystems, differing Service doctrines on the degree of centralized control of assets needed to achieve efficient integration of intelligence with operations planning, and the capability of the CONUS resource base to provide trained and experienced military intelligence personnel to US forces operationally committed in the theater. Chapter 5 assesses the lessons and the implications of the US tactical intelligence experience in Southeast Asia for potential contingencies in two other overseas areas: Central Europe and the Middle East.

STUDY LIMITATIONS

(U) It should be borne in mind that the findings and lessons presented below are based on only selected portions of the US experience in Southeast Asia. The case study investigations, for example, cover three important aspects of that experience (US ground operations against enemy main force units, area security/pacification and riverine operations in one part of South Vietnam (the Upper Delta), and air interdiction against the enemy out-of-country lines of supply in the Laotian panhandle) but, because of limitations on the study effort, do not include such important mission assignments as the defense of major strong points (e.g., Khe Sanh in 1968), and coastal surveillance counter-infiltration operations (.e.g., Market Time operations). In the case of ground operations against enemy main force units, moreover, the findings relate primarily to the early period of US involvement before the supporting intelligence systems had fully matured in Southeast Asia.

(U) With regard to the interview/questionnaire program, it should be borne in mind that those who participated represent only a limited sample of US military personnel with knowledge of tactical intelligence operations in Southeast Asia. This program was conducted first among individuals who served in tactical command positions at division, brigade, and battalion levels. Although the program was subsequently conducted among selected senior professional military intelligence officers who were responsible for intelligence collection, evaluation, and production at division, Field Force, and MACV levels, the primary orientation of the study has intentionally been to the views and opinions of lower echelon tactical commanders, i.e., the tactical intelligence users.

(U) Finally, it should be noted that the assessment of the implications of the Southeast Asia tactical intelligence experience for potential conflict contingencies in other overseas areas is based on only an "exploratory" analysis of the similarities and differences in the conflict environment (operational and physical) of Southeast Asia as contrasted with that likely to apply in other overseas areas. Clearly an in-depth analysis of this kind requires a separate study based on detailed conflict scenarios tied to specific conflict situations, force structures, terrain, and environment.

KEY FINDINGS AND DISCUSSION

Tactical Intelligence Needs

> *(U) 1. The primary requirement of tactical intelligence from the point of view of tactical commanders in Southeast Asia was to produce targets for immediate combat response. Overwhelmingly, tactical commanders cited as their key intelligence need the location of enemy units and base camps.*

(U) Operational requirements in Southeast Asia demanded that the tactical intelligence effort serve both the more immediate needs of target acquisition and the longer term needs of operational planning and assessment. The emphasis on targeting requirements stemmed from the offensive orientation of US forces and the demands of the tactical situations which required the commander to find, fix and destroy enemy forces in an operational environment in which the enemy often presented only a small, mobile target with a minimum signature.

(U) In addition to "location," aspects of enemy targets of particular significance in Southeast Asia were:

- size and density (degree of concentration of enemy forces or materiel)
- pattern and direction of movement (if moving or able to move)
- persistence (how long the target will stay in place or range)

(U) In pacification (or area-security) operations, target location related to the VCI (Viet Cong Infrastructure) in hamlets and villages, as well as enemy local force and guerrilla units; for the interdiction campaigns in Southern Laos, target location related to LOC alignment and facilities as well as enemy vehicles, supplies, and personnel moving through the LOC system.

(U) 2. Apart from target location, other important intelligence needs in Southeast Asia varied with the nature of the operation engaged in and mission objectives.

(U) Although unit locations stood alone as the single most important tactical intelligence requirement for ground operations against enemy main force units, other important intelligence needs included: information on the composition and strength of enemy forces, the "modus operandi" (tactical behavior) of these forces, and their offensive and defensive capabilities.

(U) Important intelligence needs for area security/pacification operations included: location of base areas of enemy local forces, knowledge of the local operational area and its terrain, and knowledge of the composition, activity patterns, and attitudes of the local population.

(U) Important intelligence needs for air interdiction operations against the enemy's out-of-country LOC included: LOC capacities and rate of movement of men and materiel, LOC defenses, and post-strike damage assessment.

Intelligence Needs Satisfaction

(U) 3. A large majority of those interviewed who served at lower tactical echelons in main force and area security/ pacification operations in Southeast Asia indicated that in the early period of US operations at least tactical intelligence was generally inadequate in meeting their key operational needs. Secondary intelligence requirements, particularly those associated with longer-term planning and the build-up of an intelligence data base appear to have been better met. Those who served in air interdiction operations tended on the whole to be better satisfied with the tactical intelligence effort.

(U) With respect to operations against main force units, tactical commanders interviewed indicated that the intelligence system tended to serve their most critical intelligence needs (enemy unit locations) least well and serve their less critical intelligence needs best. In the jungled terrain of Military Regions I, II, and III, US tactical units seldom had accurate advance knowledge of enemy unit locations and strengths, or of the locations, size, functions, and prepared defenses of enemy base camps, supply points, and support facilities.

(U) Tactical intelligence needs appear to have been somewhat better satisfied in area security/pacification operations primarily because of the greater availability and applicability of HUMINT to collection needs and the fact that South Vietnamese collection resources could be exploited through combined operations. Intelligence collection in area security/ pacification operations was most effective when:

- a strong government and friendly force presence (to include paramilitary and territorial forces) was established to provide security for the population
- effective working relationships were established between civilian, police, and territorial force organizations in the area and operations integrated at the district level

- an intelligence data base on insurgent local forces and leadership was established and built up
- the local population became convinced that a government security presence was there to stay.

(U) As noted above, tactical intelligence needs for air interdiction operations against the enemy LOC in the Laotian panhandle were generally better satisfied in the opinion of those interviewed. It should be noted, however, that:

- targeting systems on moving vehicles were sometimes redundant and developed targets in excess of strike capabilities
- locations of many truck parks, defense sites, way stations, and other LOC facilities were known but others went undetected. Means to determine site occupancy were generally inadequate.

(U) 4. Factors which appear to have contributed to this perceived lack of intelligence system responsiveness to the targeting needs of ground force tactical commanders were: the nature of the enemy and his tactics, environmental factors which adversely impacted on intelligence collection, and an upward (rather than downward) orientation of the intelligence structure.

(U) With respect to the first of these, the primary enemy target in Southeast Asia was the enemy soldier himself, individually or as part of a unit. In avoiding detection, or presentation as a fixed or moving target, the enemy had inherent advantages — relatively high mobility traveling on foot in the jungled terrain of his hideout areas, abundant cover, and superior knowledge of the terrain and environment. In his areas of influence he also often had the willing or unwilling support of the local population. These factors in combination posed a severe challenge to intelligence systems attempting to find, identify, and fix the enemy in Southeast Asia.

(U) An upward thrust characterized the intelligence process in Southeast Asia as a result of the greatly increased demand for detailed knowledge of operations, and in some cases approval of specific types of operations, and the importance attached to questions from above (including the theater and national levels) about enemy intentions, capabilities, and about progress in the prosecution of the war. This upward orientation tended to inhibit the timely lateral and downward flow of intelligence.

Usefulness of Collection Means

> *(C) 5. Factors which had an important effect on the relative performance of tactical intelligence collection means in Southeast Asia included: environmental constraints, length of cycle time, frequency or duration of coverage, accuracy, level of resolution, ease of maintenance and operation, and vulnerability to enemy countermeasures.*

(C) Differences in collection means usefulness as between main force, area security/pacification and air interdiction operations are indicated in Table S-1. This evaluation of effectiveness is based upon interviews with tactical commanders and analysis of documentary source materials.

(U) Environmental conditions which impacted on the usefulness of various collection means included the degree and type of vegetation and cover, terrain masking effects, and weather. Most affected by these environmental factors were ground and airborne sensor surveillance and target acquisition systems.

(C) The reliability of certain HUMINT sources, particularly those tied to indigenous collection sources, was another factor. The frequency (or regularity) with which target areas could be covered by means of HUMINT collection sources (e.g., special patrols, long range patrols) also tended to limit their usefulness.

(U) Other collection means (e.g., information from Ralliers and PWs, local indigenous sources and some sensor systems such as the APDS-

Table S-1 (C)

USEFULNESS OF COLLECTION MEANS (U)

			MF	I	P
HUMINT	GROUND PATROLS	MACSOG	2	2	2
		LRRP (US)	2	NA	2
		UNITS IN CONTACT	1	NA	2
		OTHER FRIENDLY	2	1	1
	AIRBORNE OBSERVATION	AIR CAVALRY	1	NA	2
		FAC	1	1	1
		OTHER VISUAL	3	1	3
	INTERROG.	PRISONER (IPW)	1	1	1
		RALLIER (CHIEU HOI)	1	1	1
	AGENTS	UNILATERAL (US)	1	1	1
		GVN (PIOCC/DIOCC)	NA	NA	1
SIGINT	SIGINT	COMINT	2	2	2
		D/F	1	2	2
		ELINT	3	1	3
SENSOR	GROUND	UNATTENDED (UGS)	NA	1	2
		SURV. RADARS	3	NA	2
	IMAGE INT.	LLTV	2	2	2
		STARLIGHT SCOPE	3	2	2
		NOD (ACTIVE/PASSIVE)	2	1	2
	AIRBORNE	SLAR	2	2	3
		IR	3	2	2
		BLACK/WHITE PHOTO	2	1	1
		SNIFFER (APDS)	2	NA	2

Key:

1 = Always   2 = Sometimes   3 = Never   NA = Not Applicable

MF = Main Force.
I = Interdiction.
P = Pacification.

Sniffer) were frequently limited in the degree of detail or level of resolution needed for effective targeting by tactical forces. Advanced sensor systems which provided a high degree of resolution on the other hand were not only limited by environmental factors but were also often difficult to operate and maintain.

(S) Some collection means were also affected by enemy countermeasures which included:

- use of camouflage to reduce detection by aerial photography and visual observation
- remoting of radio transmitter locations from units and headquarters served
- deception by redundant location of base areas and support facilities.

(U) Finally, and perhaps most important, were limitations on performance deriving from the length of cycle time associated with the processing, interpretation and analysis, and dissemination of tactical intelligence provided by various collection means. Factors bearing on cycle time are discussed later in this Summary.

(S) 6. For ground force operations against enemy main force and local force units, the most useful intelligence collection means employed and available to US tactical elements were considered to be: SIGINT (D/F), prisoner and rallier interrogations, agent reports, captured documents, and contacts generated by air cavalry and airborne FACs (Forward Air Controllers). Of these, air cavalry reconnaissance and FACs were most highly regarded by tactical commanders because of the direct coupling with quick-reaction strike capabilities.

(S) SIGINT came of age in the Southeast Asian conflict and proved its value as an intelligence collection tool applicable both to the target acquisition needs of tactical commanders and the operational planning and intelligence data base needs of the higher command echelons. The use of SIGINT for targeting purposes was hampered in some early operations by the fact that DF locations were not passed directly to battalion and brigade headquarters but were relayed instead to Corps level collection management authorities for analysis and later dissemination.

(C) IR and SLAR were of limited usefulness, primarily because of the lack of an effective in-flight readout capability, but had value in developing analyses of enemy movement patterns over extended periods.

(U) The airborne APDS (People Sniffer) was of limited usefulness to most tactical units. In some instances, however, when teamed with air cavalry and armed helicopters (e.g., 9th Division operations), the ADPS produced excellent results.

(U) Unattended Ground Sensors (UGS) acquired by US tactical ground units through the Duffle Bag program found their greatest use in an anti-intrusion role on the approaches to US forward positions and fire support bases. Despite problems of false alarm rates and inadequate target discrimination, most tactical commanders felt that UGS have a high potential for effective intelligence collection. Clearly, however, unattended sensor systems did not achieve maturity in the organizational and operational context of offensive ground operations in Southeast Asia.

(U) Photographic reconnaissance was used intensively in Southeast Asia throughout the war and provided essential terrain-related data for planning ground operations. The built-in delays of mission execution, home-base processing and interpretation, the sheer magnitude of the task of analysis and interpretation, however, limited its usefulness for day to day tactical operations. Highly valued by tactical commanders in ground operations, on the other hand, was the timely reconnaissance provided by FACs with a hand-held camera.

(S) 7. For air interdiction operations in Laos, airborne SIGINT, airborne observation (FACs and other visual), prisoner and rallier interrogations, analysis of captured documents, unattended ground sensors, night vision devices, and aerial photography all made important contributions to the intelligence collection effort.

(U) Photographic reconnaissance, though limited to good weather, remained a primary source for intelligence concerning the condition of and enemy activity on the LOC system. As noted, however, one major problem in photo reconnaissance intelligence was the workload required for analysis and interpretation — one which placed considerable strain on the resources and capabilities of 7th Air Force units.

(U) FAC operations, both day and night, were an indispensable intelligence collection asset for air interdiction operations. Hand-held camera photography collected by FAC aircraft crews proved to be a surprisingly effective quick-fix means for photographic intelligence in interdiction operations. The results were good and turn-around time was quicker than strip photography.

(S) Unattended ground sensors (the Igloo White system) gave the best measure of throughput on the LOC and provided the only all-weather, 24-hour collection capability available. The Igloo White systems, however, suffered from:

- an inability to discriminate target types (tanks, trucks, artillery)
- limitations in area coverage to fully compute values for logistic throughputs.

(S) 8. In the target-poor operational environment of Southeast Asia, the primary purpose of intelligence collection (from the point of view of lower tactical commanders) was to produce targets for immediate combat response. Tactical commanders, however, particularly in the early

period of US operations, were generally critical of the length of cycle time required for the processing and dissemination of intelligence relevant to their targeting needs. Systems management factors which tactical commanders felt impacted adversely on tactical intelligence cycle time were:

- the need for information collected by assets capable of serving both tactical target development and longer-term planning needs to be processed and analyzed at higher echelons first before dissemination to lower tactical levels.
- the control of selected (but key) intelligence collection assets at command echelons one or two levels higher than the levels where combat response would be.
- security controls on sensitive source intelligence which prevented immediate access to relevant target information on the tactical commander's area of operational interest.

(S) Certain collection assets were capable of serving both tactical target and longer-term operational planning needs in Southeast Asia. When a direct readout capability to provide tactical commanders with relevant target information on their areas of interest was lacking (as was most often the case), processing and analysis of the data had to be carried out at higher echelons and targeting information disseminated to the lower tactical levels through normal channels. In addition, security restrictions imposed on the dissemination of sensitive source intelligence sometimes operated to deny tactical unit commanders access to intelligence which they considered vital. This was particularly true of "perishable" intelligence associated with targeting. Given this, it is not surprising that in some cases information which might have been of value for targeting purposes was not received at lower tactical echelons in time for effective strike action.

(U) There was a strong tendency on the part of tactical commanders interviewed to urge that <u>Division</u> should control key collection means that contribute to target development. This stemmed from the perception on their part that those collection means for which control was exercised at, or close to, those levels where strike actions were initiated tended to be most effective (and timely) in meeting their intelligence needs.

> *(S) 9. The length of cycle time required for the receipt of tactical intelligence at the lower tactical echelons was less a function of the level at which collection assets were assigned (despite the perception of many tactical commanders in this regard) than the time required for the processing and analysis of the information collected and the capabilities of the data transmission and read-out systems available.*

(S) While not unique in terms of information needs to be served, the demands imposed on intelligence systems in Southeast Asia were particularly heavy given the vital need for useful intelligence to support operational planning, the need to build up an adequate intelligence data base to permit analysis of enemy capabilities and intentions and serve the intelligence process as a whole, and the need to respond to the requirements for information from higher authorities at theater and national levels as well as the need to provide tactical commanders with relevant target information on their areas of interest. The distinction between these information needs and the priorities to be assigned were not well recognized during the early period of US operations. The key time-related variables in the intelligence process during this period, however, were those affecting information processing, interpretation, and analysis. Echelon of control decisions, particularly for those collection assets capable of serving both tactical target development and longer-term planning needs were tied in part to the question of where such processing and analysis could be best undertaken. Other factors which influenced the level at which such assets were assigned were the number of such assets available (the allocation problem), requirements for maintenance and operational support, and — in some cases — the security-sensitive nature of the source involved.

(S) 10. Tactical intelligence responsiveness improved markedly during the later period of US operations in Southeast Asia as:

- *Organizational solutions were developed for the immediate integration of tactical intelligence into the operational planning process (e.g., the establishment of Tactical Operations Centers) at battalion/brigade/division levels.*
- *Collection systems were developed which were directly coupled with reaction-strike capabilities in near-real time.*
- *Collection systems were developed which provided read-out of target relevant information directly to tactical commanders.*

(S) To meet the need for rapid and effective integration of intelligence with the operational planning process, Tactical Operations Centers (TOCs) were instituted over time at the battalion/brigade/division levels in Southeast Asia. The use of TOCs or TOC-like organizations appear to have improved the evaluation and dissemination of targeting information to tactical commanders. Tactical intelligence cycle time was reduced to the minimum, however, when collection systems could be directly coupled with reaction-strike capabilities and/or provide direct read-out of targeting information in the tactical commander's area of operational interest. One example of this was the control of air-alert strike aircraft by the Interdiction and Surveillance Center of the Igloo White operation. The use of air cavalry units in association with aerial surveillance or ADPS equipment in a patrol mode was another.

Organization, Management, and Readiness Issues

(U) 11. US Forces entered into operations in Southeast Asia without the advantage of pre-conflict analysis of potential tactical intelligence needs and with little or no intelligence data base in their hands

on the area, the people, or the enemy. The development of the latter had to start essentially from scratch and be painstakingly assembled during the early period of US operations.

(U) The failure to undertake such analysis or develop a contingency intelligence data base was not disastrous in Southeast Asia because of the phased deployment of US forces. It should be pointed out, however, that US advisory forces had been present in South Vietnam since 1954 and South Vietnamese forces had on hand an extensive data base on the enemy and his area of operations. The French had also accumulated a massive amount of material on the same subjects. There is no doubt that the lack of contingency planning and availability of an exploitable intelligence data base hampered initial operational and intelligence planning.

(U) 12. The essential organizational requirement that had to be met in Southeast Asia was an intelligence structure capable of combining and integrating joint US and allied intelligence collection and analysis efforts.

(U) In Vietnam, the intelligence available from South Vietnamese Government sources was essential to the successful prosecution of the war. At the same time, US-developed intelligence had to be shared with allied forces. The joint and combined intelligence organization that evolved over time during the conflict seems to have met that challenge and to have achieved satisfactory levels of performance.

(S) 13. Security considerations relative to intelligence operations were an important concern in Southeast Asia. Although stringent security controls on all-

source intelligence did tend to delay receipt by tactical commanders of information relating to potential targets in their areas of operations, the protection of these sources (which provided information of great value to operational planning and the estimating process) remained essential. This problem was largely ameliorated in the later period of US operations when additional clearances of the appropriate kind were authorized for more personnel at the lower tactical echelons and provision made for direct collateral flow of information relevant to the tactical commander's intelligence needs. The security problem posed by the need to protect sensitive intelligence information relating to operations involving local government forces, however, continued to exist throughout the period.

(S) US and allied operations in Southeast Asia were peculiarly vulnerable to enemy intelligence penetration. The problem with respect to the timeliness of all-source intelligence in helping to satisfy the targeting information needs of tactical commanders appears to have been satisfactorily resolved by the measures indicated. The separate organizational context within which all-source intelligence was gathered, however, made adjustments or changes in operational procedures difficult to achieve.

(S) The problem of protecting sensitive intelligence information that was shared with local government forces and agencies, on the other hand, was never satisfactorily resolved. This problem was most serious in the operational arena where requirements for prior coordination of ground operations, artillery employment, and air strikes sometimes resulted in warning to Viet Cong or North Vietnamese forces of planned action.

(S) 14. In several cases, sensor systems based on new technology were introduced operationally in Vietnam without adequate provision for training of operations and maintenance personnel, logistics support arrangements, and/or indoctrination of tactical commanders and staff personnel on concepts of employment and expected performance. The results, generally, were less than satisfactory.

(S) Because of the difficulty of detecting hostile activity in many areas of Vietnam, there was pressure to "experiment" with new sensor systems in operations, sometimes before the systems were fully developed and before concepts of employment, training, maintenance, and logistics support arrangements had been tested. The early versions of the "sniffer," for example, were plagued by faulty operation and lack of maintenance. The UGS, under the Duffle Bag program, were provided to ground units without adequate guidance or indoctrination in their employment.

(U) 15. In early US ground operations, intelligence trained officers were the exception rather than the rule at battalion and brigade levels. The importance of the intelligence function at these levels proved to be such, however, that a large majority of tactical commanders interviewed indicated a solid requirement exists for the assignment of professionally trained intelligence personnel at these levels.

(U) The failure to assign professionally trained intelligence personnel to S2/G2 billets at battalion and brigade levels was due in part to shortages of trained personnel. It had also become traditional practice, however, to assign combat arms personnel to these billets at the lower tactical echelons. A number of tactical commanders commented that their now strong preference for assignment of trained intelligence personnel at these levels represented a reversal of opinion from views held before entering on operations in Southeast Asia.

(S) 16. The US intelligence effort in Southeast Asia suffered initially from the lack of readily available and trained combat intelligence personnel and intelligence specialists. Particularly felt were shortages in key specialist areas (photo and other image interpreters, SIGINT specialist personnel, PW interrogators, etc). These capabilities had to be developed over time, and some requirements were never satisfactorily met in terms of numbers of fully qualified personnel.

(S) The peacetime resource base of military intelligence personnel in CONUS was of limited size and could provide only a few officers fully qualified to perform G2/S2 combat intelligence functions in the context of joint and combined operations in Southeast Asia, and only a modest number of specialists in the various intelligence disciplines. Although there was an immediate requirement to organize, train, and commit needed intelligence personnel and units as quickly as possible, it took some time for the schools and the CONUS resource base to respond. For a considerable time, moreover, intelligence personnel assigned to Southeast Asia arrived under-trained and generally lacking in area qualifications and experience.

KEY LESSONS

(U) A number of general lessons have been drawn from this analysis regarding US intelligence operations in Southeast Asia. US tactical intelligence experience during that conflict demonstrated the need for:

- Command emphasis on the timely lateral and downward flow of intelligence (particularly in the face of pressure for intelligence to flow upward in response to higher level needs for national assessment purposes), and on the targeting requirements of lower echelon tactical commanders.
- Means to derive both targeting data and non-perishable intelligence from the output of those collection systems whose "take" is useful in both modes.
- Development of systems and procedures which couple acquisition to strike capabilities in a near real-time mode for perishable targets.
- Integration of operations and intelligence functions in TOC-like arrangements at division, brigade, and battalion levels.
- Provision of adequate counterintelligence and security in combined operations without unduly inhibiting rapid dissemination of perishable intelligence to tactical commanders.
- Attention to problems of initial indoctrination, training, maintenance, and logistics when new equipment is introduced in a combat theater.
- Assignment of intelligence trained and qualified officers at division, brigade, and battalion levels in G-2/S-2 billets.

- Maintenance of an adequate corps of trained intelligence specialists in the areas of sensor imagery interpretation, communications intercept and traffic analysis, prisoner interrogation, and document exploitation.
- Procedural concepts and, where possible, pre-planned organizational structures for intelligence aspects of joint and combined operations.
- Maintenance of an intelligence data base on areas of likely future contingencies adequate to support planning and initial operations.

IMPLICATIONS FOR FUTURE CONTINGENCIES

Effects of the Operational Environment on Collection Systems

(U) Chapter 5 of the report discusses the operational and physical environmental factors associated with likely conflict scenarios in Europe and the Middle East. From this perspective, each of the Southeast Asia findings with respect to performance of specific classes of intelligence collection is examined for its applicability to Europe and the Middle East. General conclusions are as follows:

(U) a. The constraint of vegetative cover and concealment which severely restricted performance of airborne photography, IR, and radar in Southeast Asia will be considerably less important in Central Europe and not a factor of concern in the Middle East.

(U) b. Weather, cloud ceilings and fog, especially during the winter months, will be more of a factor in restricting airborne visual, photographic, and IR surveillance in Central Europe than was generally true for Southeast Asia. Weather should not be a major force in the Middle East.

(S) c. Airborne collection platforms, except for very high altitude aircraft, RPVs and satellites will have to cope with a much more intense and sophisticated air defense environment in Europe and in the situation posed in the Middle East than was encountered in Southeast Asia. This will severely restrict FAC and air cavalry operations, and may demand greatly improved stand-off capability for MTI radar surveillance and SIGINT collection.

(S) d. The ECM threat, which was limited to SIGINT collection in Southeast Asia, will pose potential problems both in Europe and the Middle East for airborne and ground-based radars, data links required by airborne collection platforms and UGS, and electronic navigation and position location systems.

(U) e. The operational scene in Europe and the Middle East will be "target rich," unlike the situation for ground operations in South Vietnam. The following consequences are evident:

- Vastly improved data transmission, processing, and analysis capabilities will be required in order to handle the greatly increased volume of target reports.
- Fire control and tactical aircraft strike control procedures must be developed to optimize attack of priority targets and employment of available strike assets.

(U) f. Enemy ground forces in Europe and the Middle East are expected to be predominantly armored or mechanized and therefore relatively much more mobile than the light infantry of the NVA and Viet Cong. Thus the tempo of combat operations and the perishability of forward area targets will be accelerated. This factor will place an even greater premium on timely processing and dissemination of targeting information to tactical users.

(S) g. Factors of population density and a generally supportive attitude expected in Central Europe should make HUMINT a fruitful source of intelligence, as was true in the populated delta of South Vietnam.

The Middle East's generally sparse population will offer less HUMINT opportunity, at least for agent nets and local government sources.

Applicability of Southeast Asia Lessons

(U) The important lessons relating to tactical intelligence deriving from our Southeast Asia study center more upon questions of intelligence operations and management of resources than on specific hardware problems. If these lessons are considered in the light of the hypothetical conflicts in Europe and the Middle East, all of them have relevance, though the importance of their implementation may vary with the specific situation.

(U) In Europe, because of the presence of major US ground and air forces and the existence of the NATO Command structure, much of the necessary preparation in terms of the intelligence organization, the data base, and contingency planning has been done. Much remains to be done in terms of training, procedural changes, and development of improved data collection, processing, and dissemination systems to implement the critical lessons of Southeast Asia.

(U) In the Middle East, and in general for contingency actions elsewhere in the world, the intelligence data base and organizational arrangements for joint and combined operations are as deficient now as in the initial stages of the US force commitment in Southeast Asia.

(U) Requirements for intelligence-trained officers and enlisted intelligence specialists in the numbers required for possible contingency actions represent a serious, continuing problem.

1 INTRODUCTION (U)

1.1 STUDY OBJECTIVES AND SCOPE

(U) The overall objectives of the study effort reported on herein are to analyze the tactical intelligence experience of US forces during the Southeast Asian conflict; to evaluate the relative effectiveness of the intelligence systems and collection techniques employed; and to develop the lessons learned from that experience that may have applicability to future situations.

(U) Specific study tasks in support of these objectives include:

- An analysis of the tactical intelligence needs of US combat forces as they were presented in Southeast Asia and as they were associated with different kinds of combat and security-related operations.
- An analysis of the various intelligence collection systems and techniques employed and an assessment of their relative effectiveness in meeting the intelligence needs to be satisfied.
- An analysis of the organization and management procedures used for collection, analysis, and dissemination of tactical intelligence and of the problems encountered.
- An estimate of the applicability of lessons learned to future conflict situations in which the United States might become involved. These projections are intended to accommodate significant operational and environmental differences as they may impact on tactical intelligence effectiveness.

1.2 APPROACH

(U) The approach used in the study involved three separate but interrelated research efforts: a review of official reports, histories, special studies and other available documentation relating to US combat operations in Southeast Asia, with special emphasis on the intelligence aspects of those operations; an examination in-depth of selected types of US combat operations representing different intelligence requirements; and an interview program focused on the direct experience of former tactical commanders and planners of operations against enemy forces.

1.2.1 Case Studies

(U) To reduce the data collection and analysis tasks to manageable proportions, and to focus the investigation, the study team chose to concentrate on three major aspects of the US operational experience which provided a representative cross-section of critical intelligence problems and needs. The operational mission categories chosen were: offensive operations against North Vietnamese and Viet Cong Main Force units; area security and pacification operations in the heavily populated coastal lowlands and delta provinces of South Vietnam; and air interdiction operations against the Ho Chi Minh trail complex in the Laotian panhandle. Within these mission categories, three specific operations were selected for detailed examination and analysis in the form of case studies:

- Operations against enemy main force units in War Zone C. Included among these were operations Attleboro (1966), Junction City (1967), and Yellowstone and Saratoga (1967-68).

- Area security and control operations (Pacification) in the Upper Delta (1966-69). These operations included both joint and combined US 9th Division/Navy Task Force 117/and RVNAF (South Vietnamese Armed Forces) operations in the upper delta provinces.

- Air interdiction operations in the Laotian panhandle (1968-72). These included the air interdiction campaigns known as Commando Hunt (I, III, V, and VII).

1.2.2 Interview Program

(U) Interviews were conducted with approximately sixty officers whose experience in Southeast Asia made them especially knowledgeable of the intelligence needs of US combat forces during the entire period of that conflict. The interviews, which took the form of extended briefings, served to refine and validate the analysis and findings developed from the distillation of documentary materials relating to Southeast Asia operations (and the specific case study investigations) and provided data concerning tactical intelligence experience not available in documentary sources.

1.2.3 Questionnaire

(U) A questionnaire specifically designed to elicit the views and opinions of senior officers on key tactical intelligence issues was developed in supplement to the interview program. The questionnaire was administered first to individuals who served in tactical command positions at division, brigade and battalion levels. Subsequently, the same questionnaire was administered to senior professional military intelligence officers who were responsible for intelligence collection, evaluation and production at division, Field Force and MACV levels. In this way the study separately addressed the experience of the users and producers of tactical intelligence in the three major operational areas of interest: operations against enemy main forces, area security/pacification operations, and interdiction operations against the enemy LOC in the Laotian panhandle.

(U) Questionnaire respondents were asked to identify the key tactical intelligence needs for each of these basic mission types and to rank them in order of importance; to indicate the adequacy of the intelligence received for the needs to be satisfied (by scaled value); to indicate the usefulness of the various intelligence collection means available to them (by scaled value) and the reasons for low usefulness ratings of particular collection means; to recommend the appropriate echelons of control for various collection means; and to recommend improvements needed in tactical intelligence systems and procedures in such areas as organization, management, personnel, and training.

(U) Some seventy questionnaire responses were received and analyzed (some individuals provided responses covering their separate experiences in main force operations and pacification). This body of data, although only a limited sample of Southeast Asia experience, proved to be an invaluable supplement to the documentary sources. It formed a basis for presentation of quantitative measures in intelligence system performance and provided important insights into the nature of the intelligence problems of the several different operations which were analyzed. In virtually all cases the respondents participated in lengthy structured interviews in addition to completing the detailed questionnaire, and this technique proved necessary to fully assess the views of each respondent.

(U) A reproduction of the questionnaire used in the interview program and a list of key personnel interviewed are provided at the end of this report.

1.3 DOCUMENTARY SOURCES

(U) Documentary sources consulted in the course of the research included special reports and analyses (primarily those produced by Office of Secretary of Defense, Systems Analysis, and special studies and surveys relating to such subjects as intelligence organization and concepts, the use of sensors, imagery intelligence, and pacification operations); official histories dealing with aspects of the US operational experience in Southeast Asia, including the Army Monograph series (Vietnam) and the Air Force Contemporary Historical Evaluation of Combat Operations (CHECO) series; After Action Reports of numbered units operating in Vietnam; unit and Field Force Quarterly Operational and Lessons Learned Reports; Senior Officer Debriefing Reports; and selected historical files of DOD staff agencies, in particular the Special Assistant for Southeast Asia Matters, Office of the Director for Defense Research and Engineering. The analysis of the applicability of the Southeast Asia experience to possible conflict situations in Europe and the Middle East is supported by recent intelligence-based studies and estimates of the threats in those regions.

(U) In addition to documentary sources available in the Washington, D. C. area, the study team exploited the automated data and operational files of the CINCPAC data base on Vietnam operations, particularly reports and printouts relating to air interdiction operations in the Steel Tiger area of the Laotian panhandle.

1.4 ORGANIZATION OF THE REPORT

(U) This report consists of five chapters. Chapter 2, Tactical Intelligence Needs, analyzes the intelligence needs of tactical commanders in Main Force, Pacification, and Interdiction operations and the degree to which those needs were satisfied. Chapter 3, Intelligence Collection Means, describes in summary fashion the various intelligence collection means employed in Southeast Asia and discusses their relative usefulness (what worked well and what didn't work well in satisfying the different intelligence requirements of operational forces) and what factors influenced effectiveness. Chapter 4, Intelligence Organization and Management, reviews the major features of the organization for tactical intelligence collection, analysis, and dissemination as it evolved in Southeast Asia, and discusses some of the more important organizational and management issues that were presented. Chapter 5 assesses the Implications of the Southeast Asia Experience for possible tactical operations in other overseas areas.

(U) The case studies are contained in Appendixes A, B, and C. Appendix A reviews US offensive operations against enemy main force units in War Zone C. Appendix B describes area security-pacification operations in the Upper Delta (III and IV Corps Tactical Zones), and Appendix C discusses air interdiction operations in the Laotian panhandle. Although the major findings of the case studies are incorporated in the analyses in Chapters 2, 3, and 4 of the report, the reader is urged to read the appendixes for the supporting discussions ' y provide and for a more detailed treatment of tactical intelligen' needs and problems as presented in specific operational situations.

(U) In general, the selective case studies typify user views of the tactical intelligence requirements. Satisfaction of user needs was the responsibility of the collectors, evaluators, and producers of tactical intelligence. They faced a much different set of problems and, as professional military intelligence personnel, they also on occasion placed values on specific needs different from the values perceived by tactical commanders. These differences are discussed throughout the main body of the report. The special problems and obstacles encountered by the collectors/producers are analyzed in Chapter 4.

(U) Appendix D provides a detailed survey of intelligence collection systems and techniques employed in Southeast Asia. The reader should refer to this appendix for descriptive data on the technical characteristics of the various collection means referred to elsewhere in the report. Because of limitations on the level of classification for this report, a technical discussion of signal intelligence systems and their employment in Southeast Asia is not included.

2 TACTICAL INTELLIGENCE NEEDS (U)

2.1 US MILITARY OPERATIONS IN SE ASIA

(U) Military operations in Vietnam presented the US with a new enemy, new combat conditions, and a new combat environment. US forces entered this conflict with substantially no data base for intelligence purposes on any of these key variables.

2.1.1 The Conflict Environment

(U) The Physical Environment. SE Asia offered an extremely variable and difficult terrain for operations by conventional military forces. The topography varies from rugged highlands consisting of mountains, hills, and plateaus to coastal lowlands given over to intensive rice cultivation. The flat delta terrain of the far south is seamed with rivers, canals, and smaller waterways. The natural vegetation includes dense tropical rain-forested areas that are dominant in the mountainous regions, open-forested areas that are less dense but also contain spiny and impenetrable thickets, mangrove forests in the unstable lands of inundated tidal flats, and extensive grassland areas with patches of open forest and scrub. The delta region is generally open but dense vegetation borders the streams and canals, and nipa palm thickets and hedge growth surround both the rice paddies and the villages and hamlets. Climatically, Vietnam is subject to the monsoon influence and its characteristic alternation of wet and dry seasons. The heavy and frequent rainfall of the rainy season leads to widespread flooding in the lowlands, especially in the Delta where a large portion of the area is flooded for most of the year. The low-hanging clouds and heavy showers of the rainy season significantly affect flying conditions.

(U) These terrain and weather factors obviously impacted on the conduct of military operations. The obstacles to cross-country movement, which included rugged and densely forested mountains, flood-swollen rivers and widely inundated areas, extensive tracts of permanently swampy terrain and seasonally flooded rice fields, limited most vehicular activity to the few existing roads. Trafficability for vehicles and men on foot was particularly poor during the wet season. Wet season or dry season, the best way to move around in Vietnam was by helicopter.

(U) These same environmental factors on the other hand served the enemy to advantage. The heavily-jungled and forested remote highland areas provided bases relatively safe from surprise attack by government forces. The abundant vegetation and rough terrain also gave cover and concealment from surveillance while moving from one area to another or while moving to and from attacks on government outposts. Even the continuous haze from burning rice straw that lay over much of the countryside during and after the harvest season tended to protect the enemy by making visual surveillance from above more difficult.

(U) Enemy Forces and Tactics. The nature of the enemy in Vietnam and the tactics employed also offered an essentially new challenge to US forces. The enemy, who operated in maneuver units varying in size from battalion and regimental main force units based in remote and generally inaccessible safe haven areas to small guerrilla bands operating among the populated areas of the rice-farming lowlands, presented an elusive target. Using cover and concealment to avoid detection and classic guerrilla raid tactics, the enemy attacked government forces and outposts at the time and place of his own choosing. Such attacks were usually based on good intelligence (including a thorough reconnoitering of the target to determine its vulnerabilities and the likely reaction and tactics of friendly units) and were carefully planned and rehearsed beforehand. After an attack, insurgent forces dispersed into base areas and sanctuaries using cross-country routes and trail systems with which they were intimately familiar. Defensive tactics were based on evasion and avoidance of contact with government forces when the latter were superior in numbers and firepower. Rarely staying in one location for more than a few days and operating in small units, enemy forces presented a fleeting target by day and were almost invulnerable to detection when using the cover of night for movement. Government forces in search of the enemy on the other hand were exposed to ambushes, mines, sniper fire, and booby traps.

(U) The enemy's capability for rapid movement and surprise attack derived in large measure from his highly developed if simple logistical system. Using concealed trail nets, prepositioned caches of supplies and with willing or unwilling support from the local population, his lines of supply and communication were relatively invulnerable. The enemy, moreover, had freedom of movement cross-border and could utilize his sanctuaries in Cambodia and Laos for escape and support purposes. Few enemy main force units were continuously sustained from their bases in South Vietnam but rather depended on the logistical support system that originated in the north and flanked the south from Laotian and Cambodian territory.

(U) To sum up, US forces, during the entire period of their operations in Vietnam, faced an enemy who had the capability to move slowly and steadily both in space and time over large expanses of covered terrain, to mass undetected for attacks on fixed friendly positions, and to transport large tonnages of materiel through Laos and Cambodia to supply these efforts.

(U) The Key Role of Intelligence. It is not surprising, given the nature of the enemy, his capabilities and his tactics, that the ability to acquire good intelligence and react to it quickly should be the key to effective counterinsurgency operations. While centuries old as a problem in combat, finding the enemy and sustaining the contact so he could be attacked and destroyed before disappearing into the jungle and the night, assumed new dimensions and importance in Vietnam. As a consequence, the day-to-day operations of US combat units were vitally affected by (in some cases literally dictated by) the adequacy of the intelligence available, its perishability, and the need to collect additional timely intelligence.

2.1.2 Operational Missions of US Forces

(U) Although US combat forces, when first introduced into Vietnam, were initially targeted against North Vietnamese (NVA) and Viet Cong (VC) main force units, which represented the major threat to the viability and survivability of the Government of South Vietnam (GVN), they very quickly came to participate in all phases and aspects of the counter-insurgency effort.

(U) The particular mission of US forces after their introduction and build-up was to conduct sustained offensive ground and air operations against enemy main force units on the assumption that the war could not be won unless the core of the enemy's military capability was defeated or destroyed. These operations, the objectives of which were to find, isolate, fix, and destroy enemy main force units, were conducted wherever sizable enemy formations could be found— in the open, in his base areas, and in his traditional war zones.

(U) Operations to interdict or destroy the enemy's in-country logistic and command/control system also assumed particular importance as the war progressed. These operations ranged from ground and air attacks on known base areas and supporting facilities (including the supplies and materiel stocked therein) to control over the rice harvest to prevent it reaching the enemy's hands. All operations specifically designed to isolate concentrations of insurgent strength and to cut channels of support to operating main and local force units fall within this mission objective.

(U) Border control counter-infiltration operations were given increasing emphasis as the need to seal the land and sea borders and prevent to the extent possible the infiltration of NVA units and personnel and their supplies from the north became apparent. US maneuver units conducted screening operations in and around major infiltration routes. Other surveillance and reconnaissance activities were conducted by US Army Special Forces-advised Montagnard minority contingents from camps established throughout the Laotian and Cambodian frontier region.

(U) The protection of vital friendly operational bases, headquarters, and logistical installations (base defense) also became an important concern in Vietnam where the lack of a FEBA together with the enemy's capabilities made such base installations vulnerable. Forces were deployed and specific systems developed to protect air bases, major supply points and depot complexes, to secure artillery fire bases and to defend major strong points (e.g., Khe Sanh, the scene of one of the biggest battles of the war involving US forces).

(U) LOC protection and defense, for the same reasons, assumed new importance in the Vietnam conflict. Because of the vulnerability of their ground LOC, US units were assigned specific missions for LOC security, including road clearing, convoy protection, and counter-ambush operations.

(U) As US forces succeeded in defeating and dispersing enemy main force units, the US effort turned more and more to area security and control/pacification operations against local forces in areas traditionally contested by or newly wrested from the VC. These operations were essentially supportive of GVN pacification programs, but US combat forces often assumed the initiative in area security operations to isolate and destroy enemy local forces ranging in size from battalion to armed bands of part-time guerrillas based among the local population.

(U) Related to the above, US forces also supported combined US/GVN programs aimed at the destruction or neutralization of the Viet Cong infrastructure which existed clandestinely in the villages and hamlets and exercised varying degrees of control over the local population.

(U) Also related to the above were US military psychological/civic action operations in support of GVN revolutionary development programs. While noncombat in nature, such efforts contributed to long-range pacification goals to win the good will of the population and gain popular support for government programs.

(U) Finally, a major effort and major deployment of US air power was directed at the interdiction of the enemy's out-of-country

LOC supporting the infiltration of men and supplies into the south. Air interdiction became a basic objective, perhaps the dominant feature, of overall US strategy during the later years of US military involvement in Vietnam.

(U) These operational missions, except for the last, overlapped much of the time, assumed different priorities as a function of the level and character of the threat and decisions on how best to deal with the enemy and his tactics, and varied in importance among the different operational areas in which US forces were employed. It was characteristic of the Vietnamese conflict that while it was constantly necessary to assert that this was really "one war" (and consequently demanded a single unified approach and strategy), operational requirements in fact varied from area to area as a function of terrain, enemy strength and tactics, the role of US forces vis-a-vis GVN regular and territorial forces, and political and other constraints that, for a variety of reasons, were imposed.

2.1.3 Major US Operations Examined

(U) Three major facets of the Vietnamese conflict are analyzed in this report: (1) offensive operations against the enemy's main maneuver forces, whether in densely populated or remote base and sanctuary areas; (2) pacification operations against the enemy's local forces and infrastructure in populated areas where the overriding concern was to provide security to the people; and (3) interdiction operations to prevent or drastically impede the movement of replacements, reinforcements, and supplies through the enemy's rear services system enroute to operational deployment and use in South Vietnam. Each of these operational missions posed specific requirements for tactical intelligence peculiar to itself.

(U) Figure 2.1 outlines the differing characteristics of the three basic kinds of operations examined. As can be seen the overall mission objectives and nature of the tactical targets varied considerably from one operation to another. The same holds true for the kinds of US and friendly forces involved, their disposition and deployment. Finally, terrain and population factors differed markedly as between pacification

Operations	Mission Objective	Tactical Targets	US and Friendly Forces	Terrain and Environment	Population
Ground Operations Against Main Force Units	Destroy Enemy MF Units & Bases	VC/NVA Bn. Bases and Installations	US Combat Units (Bn. & up) and Supporting Air and other FWMAF	Remote Areas, Jungled or Scrub Plateau, Mountains	Sparsely Populated
Interdiction	Interdict LOC	LOC Choke Points, Vehicles, Men & Supplies Enroute, LOC Defenses	US TACAir, Grd. Reconn & Surveil. Teams, LAO Trail Watch Teams	Remote, Heavily Jungled and Mountainous	Sparsely Populated
Pacification	Security and Control	VC Local Forces (Sqd. Plt. & Comp. Size) and Support Systems; VC Leadership	US and ARVN Combat Units RF/PF; GVN Police	Relatively Flat & Open with Intermittent Vegetation, Rice Farming	Heavily Populated

Fig. 2.1 (U)—Characteristics of Operations Examined

(or area security) operations and the other two kinds of operations conducted in the more remote and sparsely populated base and sanctuary areas.

2.2 TACTICAL INTELLIGENCE NEEDS OF US FORCES

(U) Tactical unit intelligence needs varied greatly with each type of operation as discussed above.[1] The interview and questionnaire programs conducted in the course of this study attempted to determine precisely how these needs differed in terms of their perceived importance to tactical commanders in the pursuit of various operational objectives. Interviewees were provided a basic list of intelligence needs (compiled from documentary materials relating to US combat operations) and were asked to rank them on a scale of priorities by types of operations conducted. Interviewees were also encouraged to add any need not identified on the basic list but considered crucial to operational mission accomplishment. The interview data and completed questionnaires were subjected to analysis with results as follows.

2.2.1 Tactical Intelligence Needs for Main Force Operations

(U) Since the main objective of operations against enemy main force units was to find and destroy them, the intelligence needs of tactical commanders fell into three main categories: (1) Order of Battle data, (2) enemy capabilities and intentions, and (3) local environmental factors. Enemy Order of Battle included composition of enemy forces (units by type), unit strengths, locations, command subordination, and command personalities. Enemy weapons and supply (levels/stockages) situations, offensive and defensive combat capabilities, communications capabilities, and intentions comprised the second category. Details concerning local terrain and vegetation, weather, and potential landing zones and drop zones comprised the third.

(C) Table 2.1 presents the consolidated interview and questionnaire judgments of tactical commanders as to the relative importance

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[1] See Appendixes A, B, and C for case study discussions and specific references.

Table 2.1 (C)

TACTICAL COMMANDER RANKING OF NEEDS:
OPERATIONS AGAINST MAIN FORCES (U)

Rank	Tactical Intelligence Needs
I	Unit Locations
II	Composition of Enemy Forces Enemy Modus Operandi Offensive Combat Capabilities Defensive Combat Capabilities
III	Enemy Supply Level
less than III	Terrain and Vegetation Weather Potential LZ and DZ Communications Capabilities Local Population Factors Enemy Unit Strength Weapons Intentions Enemy Key Commanders Command and Control System

of specific intelligence needs to the conduct and planning of operations against main forces. The results reflect the degree to which respondents agreed on the ranks of particular needs.

(C) Not unexpectedly, tactical commanders rated unit locations overwhelmingly as the single most important tactical intelligence requirement for operations against main force units. This unique ranking was strongly confirmed in interviews supplementing the questionnaire and in the analysis of documents supporting the case study of US offensive operations against enemy main forces in War Zone C. Other important intelligence needs cited by respondents included information on the composition of enemy forces, their "modus operandi" (tactical behavior) and their offensive and defensive capabilities (ranked second), and the status of the enemy's supply levels (ranked third).

(C) Ranked as of lesser importance by tactical commanders were local environmental factors and surprisingly, information on enemy unit strengths, weapons, intentions, and command and control systems. It is likely that respondents felt that some of these factors were fairly well known or that rigid insurgent doctrine and behavior made them of less importance. Enemy main force units, for example, were more likely to be understrength than overstrength. Enemy key commanders, while sometimes varying in leadership style and tactics employed, generally conducted operations and reacted to contacts by US and GVN forces in accordance with insurgent doctrine. And enemy command and control systems based primarily on couriers and decentralization of authority (in the early stages of US military involvement in Vietnam at least) were possibly viewed as of lesser importance in planning and conducting offensive counterinsurgency operations.

(C) It is also possible that the tendency to downgrade the importance of accurate intelligence on enemy unit strengths, chain of command, and intentions reflected a lack of confidence in the capability of the intelligence system to satisfy the needs for such information. In contradistinction to tactical commanders, the senior professional military intelligence personnel included in the survey uniformly ranked enemy intentions as a first priority item and chain of command as a second priority. Such rankings are consistent with the professional view that accurate knowledge of the enemy's command structure and intentions are essential keys to the planning and conduct of successful offensive actions by friendly forces.

(C) Respondents also cited factors other than enemy intelligence as important, including knowledge of availability of US assets that might be brought to bear in combat situations as they developed, the location and condition of surface LOCs and routes for armor, and the loyalty and dependability of Vietnamese Army (ARVN) personnel involved in the planning of the operations under consideration.

2.2.2 Intelligence Needs of Area Security/Pacification Operations

(U) The basic objective of area security/pacification operations was to establish or restore effective government control in contested areas. This required in the first instance, the destruction or neutralization of local insurgent armed units. In addition the insurgent political/military infrastructure in the villages and hamlets had to be rooted out and destroyed, the population protected from insurgent harassment, terror and propagandization, and finally programs had to be undertaken to gain the confidence of the local population and its support for the government's counterinsurgency effort. These multiple mission requirements made for a wide spectrum of intelligence needs.

(C) Table 2.2 presents consolidated results of the survey of tactical commanders who ranked intelligence needs in area security/pacification operations in order of importance. The primary needs for these operations were similar to those cited for operations against main force units insofar as the locations of enemy local force units were the prime requirement. In addition, however, tactical commanders rated information on unit strengths, local force base areas, knowledge of the terrain and local area, and the size, composition, and attitudes of the local population as also of first-rank importance. These results tend to reflect the problems of operating against smaller, more mobile enemy formations, the need to know where and understand how such forces are based, and the important role of the local population as either a source of support to

Table 2.2 (C)

TACTICAL COMMANDER RANKING OF NEEDS:
PACIFICATION OPERATIONS (U)

Rank	Tactical Intelligence Needs
I	Unit Locations Unit Strengths Base Areas Terrain Population Size Composition and Attitudes and Activity Patterns
II	VCI Identities and Organization Local Force Composition Weapons
III	VCI Strength
less than III	Cache Sites Offense Combat Capabilities Defense Combat Capabilities Intentions Communications Capabilities

insurgent forces or as a source of intelligence and potential support for government forces. They also reflect to some degree the need for finer-grained more-detailed information to support the conduct of area security/pacification operations. One example from the category of local population factors illustrates this. It was important and necessary to be able to recognize when the local population was engaged in wood gathering and rice harvesting and other activities characterized by concentrations of people and fires, and to distinguish these from enemy areas of activity which were similarly characterized. Intelligence collection means such as the Airborne Personnel Detector (People Sniffer) and infrared devices detected such concentrations but could not readily distinguish enemy activity from that of the local population.[2]

(C) Information on the insurgent infrastructure, composition, and organization was also considered a very important intelligence need in area security/pacification operations, and reflects on the main supporting missions assigned US forces in such operations. Estimates of the actual strength of these leadership elements were considered of less importance. Other factors which were identified as of less importance by respondents included information on the offensive and defensive capabilities, the communications capabilities and intentions of local force units, and interestingly enough, the knowledge of the location of cache sites used to sustain local force operations. Here again, tactical commanders were decidedly less impressed with the need for knowledge of cache and local force supply data than were professional military intelligence officers. The latter were inclined to place a very high premium on uncovering and destroying caches as a means of degrading enemy capabilities. In minimizing the importance of cache site data, tactical commanders, however, may have been influenced by the belief that enemy supplies were easily replaced and that the discovery and destruction of small caches had little impact on local force operational capabilities.

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[2]Cf. Chapter 3— Usefulness of Collection Means.

(C) Professional military intelligence officers also agreed on the first priority rank of enemy intentions and VCI identities, along with unit locations and base areas, whereas tactical commanders ranked VCI identities as a second priority need and intentions as less than third priority. In addition to what has already been stated about the different perceptions of need for intelligence on enemy intentions, the other differences may be attributed to the professional's belief that senior VCI with many years of in-place contact with and control over the local population were not easily replaced when eliminated. The combat force orientation of tactical commanders undoubtedly inclined them to focus more exclusively on data concerning local force unit locations, strengths, and bases of operations.

2.2.3 Intelligence Needs for Air Interdiction Operations

(C) The interdiction campaign in the Laotian panhandle had a primary objective of impeding the flow of men and materiel to South Vietnam. In order to accomplish this objective, tactical air wing commanders had also to suppress enemy air defenses along LOC alignments. Operations were carried out against both immediate and preplanned targets. Immediate targets included troops in the open, vehicles (trucks), and river craft, while preplanned targets were mostly storage areas, choke points, road cuts, and air defense sites. Relative to main force and pacification operations, available targets in the interdiction campaign were more numerous and of wider variety. In this sense, tactical intelligence needs for interdiction were much greater than for ground operations. In addition, there was a more urgent requirement for precise data especially with regard to interdiction target and defense site locations because of target validation procedures and the prevailing rules of engagement.[3]

(C) Intelligence needs for interdiction operations fall into three main categories: target systems data, target category and vulnerability data, and target damage assessment data (BDA).

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[3] Cf. Appendix C for a discussion of target validation procedures and rules of engagement.

(C) The first category, target systems data, includes enemy rear services command organization, unit headquarter locations and unit strengths; LOC alignments, capacities (tons per day, number of men per day), and vulnerabilities (choke points, river crossings, etc.); and enemy modes of operation. Enemy modes of operation are subdivided into seasonal movements of men and supplies, day/night movements of men and supplies, LOC maintenance and repair systems, area dispersal practices, and methods for attack alert within target complexes.

(C) The second category, target category and vulnerability data, includes target classification and description, location, function, mobility (fixed, mobile, moving) rate of movement (if moving), target active defenses (SAM, AAA), locations of active defenses, target passive defenses (canopy, bunkers, camouflage, etc.), and target communications and recovery capability. Strike approach terrain, weather, and visibility which are operational needs of strike pilots also fall in this category.

(C) The third category, BDA, includes intelligence needed for post-strike evaluations. These are dates and numbers of previous strikes, types of aircraft employed, types and quantities of ordnance delivered, pilot observed and photo interpreted damage, and target degradation estimate.

(C) Simply stated, the tactical planner and combat commander needed accurate, timely and all source intelligence on: (1) the location of fixed and moving targets (generally time sensitive); (2) what the enemy was storing and moving; (3) the strength and location of enemy air defenses; (4) how and where the enemy was moving; (5) what his time and place logistics objectives were; (6) what damage was being inflicted upon him; (7) vulnerabilities of, and specific results of interdiction efforts on his logistics system, its elements and capabilities; (8) how his logistic objectives related to the ground campaign(s) being supported; and (9) factors such as weather and terrain which influence strike operations effectiveness.

(C) Table 2.3 presents the responses of pilots and operations personnel who were asked to rank intelligence needs in orderof importance for air interdiction operations. As can be seen from the table, knowledge of the LOC physical layout (alignment), vulnerabilities (choke points and key facilities in the system), the exact location of the targets to be attacked, and information on the results of the particular strike or operation were considered as intelligence needs of the first order. The capacities of the LOC system and its method of operations were also considered to be important intelligence needs though of second rank. Less important were data on the weather, terrain, location of enemy headquarter units, his command organization, and the recovery capabilities of the targets attacked. Again, this probably reflects in part the fact that terrain and weather data were more readily available and hence considered as somewhat less important, and that other of these factors were of less importance in the actual planning and conduct of the strike operation itself.

(C) Senior professional air intelligence officers generally agreed with tactical commanders in the ranking of needs as shown in Table 2.3 but with reservation. The principal reservation was that tactical commanders tended to take for granted the great, behind-the-scenes effort required to discover and maintain current knowledge on the ways and means of the enemy. This intelligence base was indispensable both to the mounting of near-real time target acquisition and strike operations, and to the making of decisions on where to concentrate collection efforts to satisfy operational needs.

2.3 SATISFACTION OF TACTICAL INTELLIGENCE NEEDS

(U) Combat operations and tactical air strikes were not necessarily initiated with the benefit of completely accurate intelligence on enemy forces, targets, or capabilities. Tactical commanders were asked to rate their intelligence needs as to the adequacy of the intelligence

Table 2.3 (C)

TACTICAL COMMANDER RANKING OF NEEDS:
INTERDICTION OPERATIONS (U)

Rank	Tactical Intelligence Needs
I	LOC Alignments LOC Vulnerabilities Target Location BDA (Pilot Observed and Photo Interpreted Damage)
II	LOC Capacities Enemy Mode of Operation
III	Enemy Unit Strength Number of Previous Strikes Dates of Previous Strikes
less than III	Weather Strike Approach Terrain Types of Aircraft Employed Enemy HQ Location Enemy Command Organization Target Recovery Capability

available to them in conducting and planning their operations. Respondents were first asked, however, whether they agreed or disagreed with the allegation that tactical intelligence in Southeast Asia ranked toward the lower end of a scale of adequacy for combat operations planning and execution. A large majority of respondents (three to one) agreed with this assertion.[4] They all offered substantially the same reason for their dissatisfaction with the intelligence system as they knew it: Long intelligence cycle time (collection, processing, analysis, and dissemination) prevented timely receipt and use of much of the available intelligence data. Collection especially was made most difficult by enemy access to cross-border sanctuaries,and lower tactical commanders who served in the early period of the war were sharply critical of the system which denied them timely access to special intelligence which might have been of significant tactical value if received in real-time or near real-time.

(U) In assessing this reaction by tactical commanders it is important to recognize the essential distinction between intelligence which serves the longer term requirement of building a picture of the enemy, how he operates, his intentions, etc. (those factors which serve the planning process overall), and intelligence which relates to an immediate tactical situation facing lower level commanders in their area of operations and serves primarily the needs of those commanders. Of primary importance to lower echelon commanders, of course, were targets to which they could react. In Vietnam, as in perhaps no other war, combat commanders had to be target oriented. In operations against main and local force units, the first requirement was always to find the enemy and then to maintain contact long enough to bring force and firepower to bear.

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[4]Those who were more satisfied with the adequacy of tactical intelligence (disagreeing with the assertion) came primarily from the group of respondents having air interdiction experience. Respondents who were most critical of the tactical intelligence system served during the early phases of the war.

This serves to explain the interest of tactical commanders in intelligence collection systems that could be tied to reaction force systems in a near real time closed loop. It also bears repeating that much of the time in Vietnam, especially in area security/pacification operations, tactical units did not plan attacks or operations as such, but rather conducted continuous reconnaissance. Intelligence collection in this case essentially served a "target acquisition role."

(C) Other comments frequently made by interviewees relating to this particular question are also worth noting. Many respondents reported that intelligence developed to satisfy their immediate tactical needs came primarily from resources under their own control. In short, many believed that they were primarily dependent on their own intelligence collection capability to meet their tactical intelligence needs. Somewhat related to this, many respondents also expressed the view that the intelligence structure in Vietnam had primarily an <u>upward</u> (rather than <u>downward</u>) orientation, the tendency being for each intelligence component to serve its own echelon first, and secondly to concentrate on answering the questions of higher echelons. The reasons for this it was observed stemmed primarily from the great importance attached by higher headquarters as far back as Washington to questions about enemy intentions and capabilities and about progress in the prosecution of the war. The questioning was intense and continuous. In other cases, this observed upward orientation of the intelligence structure in Vietnam was attributed to security considerations relating to special intelligence collection systems.

2.3.1 Satisfaction of Intelligence Needs/Main Force Operations

(S) The opinions of tactical commanders relative to the satisfaction of their needs in operations against enemy main forces are presented in Figure 2.2. This figure shows overwhelming agreement that the primary need, unit locations, was <u>rarely</u> satisfied by the intelligence system supplying data necessary for effective main force operations. These results suggest either that the intelligence system was unable adequately to determine the locations of enemy combat elements to permit engagement by US tactical forces, or that the dissemination of enemy unit location data was not timely enough for proper response by friendly forces.

Perceived Need Priority

DEGREE SATISFIED	I	II	III	<III
ALWAYS				TERRAIN & VEGETATION, WEATHER, POTENTIAL LZs & DZs
OFTEN		OFFENSIVE & DEFENSIVE COMBAT CAPABILITIES		COMMO. CAPAB., LOCAL POP. FACTORS, ENEMY STRENGTH, WEAPONS, & C&C
RARELY	UNIT LOCATIONS	ENEMY FORCE: COMPOSITION & TACTICAL BEHAVIOR		
NEVER			ENEMY SUPPLY LEVEL	ENEMY INTENTIONS, KEY COMMANDERS

Fig. 2.2 (C)— Tactical Commander Satisfaction of Needs: Operations Against Main Forces (U)

It is important to note that the finding particularly applies to offensive operations in the early phases of US combat operations. Senior commanders whose experience covered the period from about 1970 on tended to be less critical of the inability of the intelligence system to satisfy tactical command needs for enemy unit location data in full. It was, of course, during the later years of the war that SIGINT effectiveness reached its peak.

(U) Figure 2.2 also shows the intelligence needs for main force operations that were always or often satisfied in the opinion of the commanders surveyed. These included terrain, weather, enemy strength, and local population factors. These same items, however, also ranked low in order of priority (below third place). Comments from interviewees indicated that while such needs were generally regarded as important, they were less urgently required for the planning and conduct of main force operations.

(U) Of particular interest in Figure 2.2 is the ranking of the need for information on enemy intentions. This need was cited often in higher level command After Action and Lessons Learned reports, but tactical commanders surveyed in this study consistently ranked it low in priority and also in the degree to which it was satisfied. Requirements which tactical commanders considered to be of secondary importance (enemy capabilities, strength and composition) were somewhat better met. This may reflect the effectiveness of HUMINT and SIGINT systems as mentioned above and discussed in full in Chapter 3.

2.3.2 Satisfaction of Needs/Pacification Operations

(U) Figure 2.3 presents study results for the satisfaction of tactical commander intelligence needs in conducting pacification operations. The primary collection needs in pacification included information on the population and VC infrastructure as well as enemy unit locations. Specific enemy unit or target location remained a problem in pacification as in main force operations, but tactical commanders were generally better satisfied with the adequacy of intelligence for pacification purposes. Their reasons were the greater availability and applicability of HUMINT

Perceived Need Priority

DEGREE SATISFIED	I	II	III	<III
ALWAYS	TERRAIN, POPULATION SIZE & ATTITUDES			
OFTEN	UNIT STRENGTH, BASE AREAS	VCI ORGANIZATION, LOCAL FORCE COMPOSITION & WEAPONS		CACHE SITES, OFFENSE CMBT. CAP., INTENTIONS, COMMO. CAPAB.
RARELY	UNIT LOCATIONS	VCI IDENTITIES AND AGES	VCI STRENGTH	LOCAL FORCE DEFENSIVE CMBT. CAPABILITIES
NEVER				

Fig. 2.3 (C)—Tactical Commander Satisfaction of Needs: Pacification Operations (U)

resources to collection needs, and the fact that GVN collection resources could be exploited more fully in combined US/GVN pacification operations.

2.3.3 Satisfaction of Needs/Interdiction Operations

(C) Intelligence needs for interdiction operations were also better satisfied than for ground operations against enemy main force units according to the responses of tactical commanders included in the survey. Composite results are presented in Figure 2.4. The primary needs for LOC alignment, vulnerability, and capacity data, as well as target location and enemy mode of operation were almost always satisfied for the planning and conduct of interdiction operations. A primary reason for this, according to interviewees, is that (unlike ground operations) the intelligence effort and operational direction of forces for the interdiction campaign were centrally controlled, with the result that adequate and timely dissemination of intelligence information to subordinate operational commands was less of a problem. However, respondents were quick to agree that even though many target sites were well known in the interdiction campaign, site occupancy was less frequently known to permit timely targeting.

(C) Another interesting finding of Figure 2.4 is that primary needs of strike pilots for such data as weather and strike approach terrain were always satisfied, but yet ranked low in priority. This finding is probably owing to the fact that these information needs were readily satisfied and were therefore not thought of as critical requirements by operational commanders.

(C) The interdiction campaign had a unique requirement to measure throughput on LOCs; that is, quantities of men and materiel. The use of unattended ground sensors, and airborne radio direction finding assets to satisfy this need is discussed in the following chapter.

DEGREE SATISFIED \ Perceived Need Priority	I	II	III	<III
ALWAYS	LOC ALIGNMENTS		NUMBER OF PREVIOUS STRIKES	WEATHER, STRIKE APPR. TERR., BDA—TYPES OF A/C EMPLOYED
OFTEN	LOC VULNERABILITIES, TARGET LOCATION, BDA	LOC CAPACITIES, ENEMY MODE OPER.	DATES OF PREVIOUS STRIKES	
RARELY			ENEMY UNIT STRENGTH	ENEMY HQ LOCATION & COMMAND ORGANIZATION
NEVER				TARGET RECOVERY CAPABILITY

Fig. 2.4 (C)—Tactical Commander Satisfaction of Needs: Interdiction Operations (U)

3 INTELLIGENCE COLLECTION MEANS (U)

3.1 COLLECTION MEANS EMPLOYED IN SOUTHEAST ASIA

(U) Tactical intelligence collection systems employed in Southeast Asia may be conveniently categorized under three headings: SENSORS, SIGINT, and HUMINT. Because of the special role of Forward Air Controllers (FACs) as gatherers of tactical intelligence, their role is discussed separately (apart from HUMINT systems). The various collection means described in summary form below are discussed in more detail in Appendix D of this report entitled "Survey of Tactical Intelligence Collection Systems Employed in Southeast Asia."

3.1.1 Sensors

(U) The special nature of the Vietnam conflict led to the deployment of a great variety of sensor-based intelligence collection equipment. Some consisted of old techniques (airborne visual observers, ground surveillance radars, etc.) which were modified, adapted and sometimes reinvented, while others (night vision devices, unattended ground sensors, condensation nuclei personnel detectors, etc.) were specifically developed in response to the particular requirements of Southeast Asia.

(U) Radars. Two general categories of radar equipment were deployed in Vietnam: (1) ground-based radars and (2) airborne side-looking radars. The ground-based equipment categories were:

- ground surveillance radars
- foliage penetration radars (Camp Sentinel Radars)
- counter-mortar radars.

(U) The ground-based surveillance radars are all non-coherent pulse-doppler radars using MTI techniques for detecting moving personnel and vehicles. Table 3.1 summarizes their basic characteristics.

(C) Most of this equipment was fielded early in the conflict from available stocks. The method of employment and level of control varied with tactical situations, and although the radars had inherent limitations (weight, old technology, line-of-sight problems, etc.) in the hands of inventive local commanders, they found numerous applications especially for night defense in conjunction with such other sensor devices as NODs, UGS, and countermortar radars under division G-2 control.

(C) Foliage penetration (FOPEN) radars were developed, under ARPA sponsorship, to provide the capability for detecting walking intruders in the presence of vegetation. Several versions were developed and fielded on an experimental basis in the period 1968-1969. These radars featured:

- UHF (430 MHz) carrier frequencies for foliage penetration
- coherent range-gated, pulse-doppler MTI
- electronically step-scanned antenna arrays
- automatic alarm features
- balanced doppler processing for reducing false alarms due to moving foliage.

FOPEN technology also included a helicopter-borne metal target detector (METRA) whose test results were insufficient to justify systems development and deployment but encouraging enough to warrant continued exploratory research and development.

(C) The airborne side looking radars (SLAR) were the AN/APS-94C installed in the Mohawk OV-1B aircraft, and the APQ-102 installed in the RF-4C aircraft. The Mohawk system was deployed to Vietnam in 1965 and saw continuous use thereafter. It was deployed in Surveillance Airplane Companies (SAC) under the control of Corps/Field Forces and MACV. Each SAC had 18 Mohawk OV-1A (visual/photo), 6 OV-1B (SLAR/photo), 12 OV-1C (IR/photo), and 14 Ground Sensor Terminal (GST) units. RF-4C aircraft were centrally controlled by 7th Air Force.

Table 3.1 (C)

GROUND SURVEILLANCE RADARS (U)

Type	AN/PPS-4	AN/TPS-33	AN/PPS-5	AN/TPS-25
Frequency (MHz)	8,900 - 9,600	9,375 ± 30	16,000 - 16,500	9,375 ± 30
Average Power (W)	0.5	4	1	40
Range	Max: 6 km (vehicles) 1.5 km (men)	Max: 9 km (vehicles) 1.8 km (men) Min: 90 meters	Max: 10 km (vehicles) 5 km (men)	Max: 18 km (vehicles) 4.5 km (men) Min: 450 meters
Accuracy	± 20 m range ± 10 mils azimuth	± 20 m range ± 13 mils azimuth	± 20 m range ± 10 mils azimuth	75 m range ± 2.5 mils azimuth
Crew	1	3	2	1
Transport	vehicle or man-pack (2 men)	vehicle or man-pack (6 men)	vehicle or man-pack (3 men)	1.5 ton trailer transporter

(C) Infrared Systems. Ground infrared (IR) sensors were under development during the Vietnam War and saw only limited testing in the field. Airborne IR sensors, however, found extensive use. The IR scanners installed in the Mohawk OV-1C aircraft and the RF-4C aircraft were extensively deployed. Also, the forward looking infrared sensors (FLIR) which were developed during the war found primary uses in the Air Force Gunship program. Table 3.2 shows the characteristics of most common IR scanner sensors.

(C) Personnel Detectors (Sniffers). Personnel detectors (people sniffers) are a class of equipment developed (1963-1969) explicitly in response to Vietnam requirements. All items are based on the detection of condensation nuclei although early versions featured converters to change input gases (such as ammonia or other effluents) into condensation nuclei which were subsequently measured. Three basic types of equipment were fielded in Vietnam— the Manpacked Personnel Detector (MPD) in 1965-1966, the Airborne Manpacked Personnel Detector (AMPD) in 1967, and Airborne Personnel Detector-XM3 (APD) in 1969. The MPD was extensively tested with disappointing results. In February 1967, however, the MPD was modified for aircraft installation in the UH-1 and became the AMPD. This device was tested with mixed results; it was difficult to obtain statistically valid data from the uncontrolled operational environment.[1] The final versions of equipment deployed were the APD prototype and the operational XM3 detector. Both were improved versions of the AMPDs. In all airborne applications the personnel detectors were controlled at echelons above battalion. The usual procedure was to assign the resources to the chemical sections of divisions, separate brigades, and field forces with the G2/S2 exercising primary staff responsibility and operational control.

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[1] Results from controlled experiments in Florida by Edgewood Arsenal indicate that condensation nuclei from man-made activities (fires, motor exhaust, etc.) were reliably detected even with devices featuring the effluent converters.

Table 3.2 (S)

SUMMARY OF INFRARED SURVEILLANCE SENSORS (U)

Type	AN/AAS-14A	AN/AAS-24	AN/AAS-18	AN/AAD-5
Strip Width, Deg	80	80	120	60, 120
V/H Range, RAD/SEC	0.03-0.8	0.03-0.8	0.016-2.60	0.016-2.60
Number of Detectors/Band	1	8	2	36
Spectral Regions	Visible, 8-14 μm	5 regions 2-14 μm	8-14 μm	8-14 μm
Resolution, MR	4	2.5 (CRT)	(1.5 X 1.5) or (1.5 X 3.5)	0.25 - 0.5
NETD*, °K	0.1 K	0.3 K	0.2-0.3 K	0.2 K
Notes	Original OV-1C Equipment	Updated AAS-14A for OV-1D	Designed for RF 4B, RF 4C	Updated AAS-18

*Noise Equivalent Temperature Difference

(C) Electro-optical Systems. Some of the most effective devices deployed in Vietnam for ground operations were direct view, low light level night vision instruments developed by the US Army Electronics Command Night Vision Laboratories. These low light level devices respond to visible light and require some ambient illumination (on the order of starlight) to function. Three such devices are of primary interest: the Small Starlight Scope, the Crew Served Weapons Sight, and the Night Observation Device. The Small Starlight Scope (SS) is designed as a hand-held or individual weapon-mounted night sight. The Crew Served Weapons Sight (CSWS) is adaptable to various crew served machine guns and recoilless rifles. The Night Observation Device (NOD) is a man-portable tripod mounted system used by personnel on outposts, listening posts, and forward observations posts. The NOD was often used as an important component of base perimeter defensive systems. Characteristics of the night vision devices are summarized in Table 3.3.

Table 3.3 (C)

GROUND BASED NIGHT VISION DEVICE CHARACTERISTICS (U)

	SS	CSWS	NOD
Field of view (deg)	10.5	5.6	9
Magnification	4x	7x	7x
Image tube size (mm)	25	25	40
Weight (pounds)	6	16	34

(C) Image intensifier technology was also adapted to television systems for airborne applications. These were the low light level TV (LLLTV) systems which provided more flexible installations than direct view systems such as the NOD of the EYEGLASS (a NOD with a stabilized mount for airborne use). Inasmuch as all of these systems were passive devices, they were seriously limited in detection range when used in an airborne mode without supplemental illumination. Systems developed for Vietnam included the Night Vision Aerial Surveillance System (NVASS) or An/ASQ-127, the Cobra Night Fire Control System (CNFCS), the Night Hawk System, and the Iroquois Night Fighter and Night Tracker (INFANT) system.

(C) Unattended Ground Sensors. Unattended ground sensor technology was developed in the 1960's totally in response to the requirements of the Southeast Asia conflict. Proposals to "bug the jungle" started arriving at ARPA early in 1962-1964, and eventually resulted in the development in 1966 of a seismic sensor by Sandia Corporation. Concurrently, in the summer of 1966 the IDA Jason Group was tasked by ARPA to study the Laos infiltration problem. This study resulted in the proposal of a major anti-infiltration system, which was approved by Secretary McNamara in September 1966. With this approval came the formation of Task Force 728 (Defense Communications Planning Group) with the mission to develop and deploy an antipersonnel system in Southeast Asia. The charter for the formation of this group carried a set of unique authorities: (1) immediate access to the Secretary of Defense for broad policy decisions, (2) adequate funding to meet the mission objectives, and (3) DX procurement authority. It was this group with this unparalleled charter that launched the massive R&D effort which developed the multitude of sensor devices and systems which came to be known as "unattended ground sensors" (UGS).

(C) The great variety of sensors that resulted from this effort are discussed in Appendix D. They took the forms of acoustic, seismic, magnetic, electromagnetic, infrared, radio frequency, and ignition detection devices with reporting capabilities. Three major areas of application of sensor technology evolved in Southeast Asia: Igloo White, Khe Sanh, and Duck Blind/Duffle Bag (South Vietnam).

(S) Igloo White was the code name for the application of sensors in Laos. The system as originally conceived was intended to have three parts: (1) a strong point/obstacle system for the northern part of the RVN along the DMZ, (2) an air-supported antipersonnel subsystem for the western part of the DMZ and eastern Laos, and (3) an air-supported antivehicular subsystem (Mud River) for southern Laos. The original code name for the total system was Muscle Shoals. It was later changed to Igloo White. Actually, only the antivehicular subsystem was deployed in the Steel Tiger area of Southern Laos. This system consisted of: (1) strings of sensors on the Laos road network; (2) a specially equipped EC-121 relay aircraft;

and (3) a fixed ground station, the Infiltration Surveillance Center (ISC) at Nakhon Phanom, Thailand. Besides the ground sensors the total anti-vehicular operation utilized all other available intelligence systems, e.g., aerial reconnaissance (photo, visual, IR, and SLAR), SIGINT, and HUMINT. The Igloo White system is fully described in Appendix D.

(S) When the Khe Sanh siege was underway, General Westmoreland decided to divert the planned antipersonnel system resources to that area. Almost immediately sensors were deployed along the northwestern trail approaches to Khe Sanh and were linked to the ISC (Thailand) via the specially equipped EC-121 relay aircraft. The system proved cumbersome to operate and was soon improved by the introduction at Khe Sanh of ground monitoring devices (MICROTALES) which gave ground commanders the capability to read sensor activations in real time, utilize the intelligence through pattern analysis and react with artillery and directed aircraft strikes. The highly successful employment of UGS in the defense of Khe Sanh and a subsequent use in the A Shau valley prompted General Westmoreland to decide in the spring of 1968 that sensors should be made available to support all ground operations in South Vietnam. This decision was implemented by the Duel Blade and Duffle Bag programs under which unattended ground sensors were introduced into tactical unit operations under division G-2 control.

(C) UGS were employed in three basic roles: intelligence, security, and target acquisition. In normal use each sensor string was assigned only one role which was, however, changeable depending on the tactical situation. Intelligence strings were used in division reconnaissance zones to gather information, and activations were not usually fired upon. If possible the area of activation was visually reconnoitered. Security strings were used to provide early warning to fire bases and base camps. Activations were responded to with the consideration that immediate and direct fire tended to compromise string locations and cause loss of intelligence. Therefore, gunships or sniper teams were often employed to establish a visual sighting before fire was delivered. Target acquisition strings were employed in areas where cross-country movement was channelized and well-defined, and whose use the division needed to deny to the enemy. Activations were responded to immediately and directly by artillery fire and air strikes.

3.1.2 Signal Intelligence (SIGINT)

(C) Radio Direction Finding (DF) Systems. DF systems initially available to US ground forces in Vietnam included the portable, but normally jeep-mounted, AN/PRD-1 providing short-range direction finding (SRDF) and COMINT collection at HF and VHF, and the transportable AN/TRD-4 medium range system (MRDF).

(S) The AN/PRD-1 employed in some quantity in Vietnam by direct support units (DSUs) and separate detachments proved to have limited range and location accuracy in DF against HF emitters because of problems of multi-path (sky-wave and ground-wave) interference, terrain masking of the direct wave, and the fact that the rotating loop antenna is low in gain and provides only crude bearing accuracy. Thus DF teams, to be successful, had to operate in exposed locations close to enemy emitters.

(S) The AN/TRD-4 was employed only in a few locations and did not generally provide effective target locations. The accuracy obtainable at medium to long ranges at HF operating on the sky-wave or a combination of direct wave and sky-wave signals was generally not satisfactory. Later in the Vietnam War the AN/TRD-23 was introduced in small quantities and utilized in widely separated ground locations to provide HF and DF collection at medium to long ranges.

(S) Airborne Radio Direction Finding was relatively more successful. The AN/ARD-15 operated in the RU-6A and RU-8D aircraft provided location of HF radio sites to an accuracy generally sufficient for artillery fire and air strikes. A variation in the airborne DF systems introduced at a later stage in the war was the "V scan" which provided effective VHF-DF with a spinning loop antenna. This system used in the RU-21D aircraft gave bearings at angles to the side of the aircraft and permitted stand-off DF with acceptable accuracy. Table 3.4 lists characteristics of USASA DF equipment utilized in Vietnam.

(C) COMINT Collection. COMINT collection was accomplished from selected sites in Southeast Asia. Airborne collection was accomplished by a variety of aircraft usually under operational control of the Collection Management Authority (CMA) at Corps/Field Force level. A summary of USASA

Table 3.4 (C)

US ARMY DF/INTERCEPT EQUIPMENT (U)

DESIGNATION	FREQUENCY BANDS	MODULATION	ANTENNA	EMPLOYMENT
AN/PRD-1 *	0.1 - 30 MHZ 12.5 - 30 MHZ	AM FM	Manually rotated loop	Mounted in ¼ ton truck used for forward area SRDF and intercept
AN/TRD-4 *	0.54 - 30 MHZ	AM, FM, voice, CW, MCW, RTT	Crossed U Adcock - electrically rotated beam	Mounted in 2½ ton truck - used for MRDF and intercept
AN/ARD-15*	0.5 - 30 MHZ	AM - CW	Wing-mounted dipoles	ARDF-RU-8 RU-6, U-1A
AN/TRD-2[illegible]*	1.5 - 20 MHZ	AM voice, CW MCW, RTT, FM	25 top loaded vertical monopoles 30' high set in a circle of 150-300'	MRDF and intercept
"V SCAN"	20 - 76 MHZ DF 20 - 150 MHZ intercept	AM - FM	Spinning loop	Used in ARDF and intercept in U-21A aircraft

* Reference data USASA TO&E units, March 1971

airborne platforms in Vietnam is provided in Table 3.5. Other COMINT and ELINT collection was accomplished by Air Force and Navy-operated airborne platforms and was coordinated by the CMA for in-country operations.

(C) USASA Organization. The USASA in RVN operated under control of the ASA Group Headquarters. An ASA battalion was assigned to each Field Force with ASA companies providing direct support (DSUs) to each US Army division, and ASA detachments supporting separate brigades. The ASA aviation battalion basically provided one ASA aviation company to support US Army units in each CTZ.

(U) USAF and USN Organization. Discussion of USAF and USN SIGINT collection means is excluded because of special classifications applied to source material describing such operations.

3.1.3 Forward Air Control (FAC) Operations

(U) Prior to the war in Vietnam the role of Forward Air Controllers was primarily to remain on the ground and advise ground commanders in the use of tactical air for close air support. In Vietnam the Forward Air Controller was used both as a ground-based and an airborne observer and his unique capabilities for intelligence gathering, target location, target identification, artillery fire and air strike direction (target designation), and battle damage assessments were quickly recognized and effectively exploited. FACs who operated from Nakhon Phanom (NKP) in Thailand where the ISC was located also provided very valuable intelligence on infiltration route serviceability and repair activities. These reports were most useful in selecting UGS string locations.

(C) FAC Aircraft. Types of FAC aircraft utilized in Vietnam and Laos may be divided into three categories: propeller-driven slow movers (O-1, O-2, A-1, and OV-10), jet or fast movers (F-100 and F-4), and large FACs (C-123 and C-130). Basic characteristics of each are provided in Appendix D.

Table 3.5 (S)

USASA ARDF AIRCRAFT - RVN (U)

AIRCRAFT	FUNCTION	PERIOD IN RVN	NUMBER[a]
RU-6A (BEAVER)	HF-DF	62-72	22
RU-8D (SEMINOLE)	HF-DF	63-73	44
CV-2B (CARIBOU)	HF, VHF-DF/Collection	66-67	1
RU-1A (OTTER)	HF-DF/Collection	67-71	2
SP-2E (NEPTUNE)	HF, VHF-ECM/Collection	67-72	6
UH-1D (IROQUOIS)	HF-DF/Collection	67-72	4
OV-1C (MOHAWK)	VHF-DF	68-69	-
RU-21A (UTE)	HF, VHF-DF/Collection	68-72	5
RU-21D (UTE)	VHF-DF/Collection	70-72	16

[a] Numbers varied during period of introduction and utilization in RVN. Extent of MOHAWK employment in ARDF role was not extensive.

(S) Auxiliary Equipment. Auxiliary equipment used in FAC operations included: (1) binoculars (for daylight search); (2) night observation devices (for light intensification and image enhancement during reduced visibility and darkness); (3) illumination (using flares or searchlights); (4) smoke bombs (to mark target areas for daytime strikes); (5) white phosphorous (for target marking); (6) LORAN (for aircraft location, target location, and laser designation from a standoff position); (7) photographic equipment (hand-held black and white cameras were generally used by slow moving FACs and jet FACs occasionally used their strike cameras); (8) laser designators (for laser illumination of targets and use of laser-guided bombs by strike aircraft); (9) airborne personnel detector (APD) (used for locating groups of infiltrators and bivouac areas); (10) radar (moving target indicator (MTI) radar for detection and location of trucks); and (11) FLIR (forward looking infrared sensors used for target location).

(S) Items 8 thru 11 were used in limited numbers and in the later years of the conflict. The more sophisticated devices such as radar with MTI, and FLIR were more experimental in nature and used in limited numbers, primarily as equipment on the AC-130 gunships which served as its own FAC after being directed into a lucrative target area.[2]

(S) Methods of Operation. FAC operations were conducted 24 hours a day, weather permitting. Normally each FAC was assigned a specific geographical area of coverage. Methods of operation varied with the type of aircraft and the area of operations, but mission responsibilities remained essentially the same: daylight visual reconnaissance and observation of enemy activities (including troops, trucks, and rivercraft); uncovering or detecting enemy targets; marking targets; directing air strikes against marked targets; reporting battle damage assessments; and supporting rescue operations.

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[2] The AC-130, as a FAC, used a 2 KW illuminator searchlight to assist fighter aircraft in detecting targets. In the spotlight mode it was used to pinpoint the target while the aircraft was in its firing orbit.

(C) During daylight hours, FAC missions were generally 4 to 5 hours in duration. All targets were reported immediately to the Tactical Air Control Center (TACC) or to the Airborne Command and Control Center (ABCCC). The FAC then remained in visual contact with the target until arrival of strike aircraft and establishment of radio contact with them. Upon mating of strike aircraft with the FAC, the latter proceeded to mark the target or its vicinity with smoke or phosphorous. After initial attack by the strike aircraft, the FAC continued to assist with precise adjustment instructions for target location and, in event of a successful hit on target, attempted to observe and report bomb damage. Conditions permitting, the FAC took hand-held black and white pictures of the target area, sometimes both before and after the strike.

(S) Visual observations at night were more difficult. When a target such as a truck convoy was detected, the night FAC called for strike aircraft and upon their arrival illuminated the area with flares and then stood off to assist in strike operations. Location of antiaircraft fire at night by FACs greatly assisted in pinpointing defensive gun locations and even directing strikes against them for defense suppression.

3.1.4 Human Intelligence (HUMINT) Systems

(C) The HUMINT collection means employed in Southeast Asia to meet tactical requirements were essentially ground reconnaissance patrols, agents, prisoner and rallier interrogations, document translations, visual aerial reconnaissance, and non-combatant civilians who volunteered information about the enemy. To these must be added friendly units in contact which were especially useful in confirming other sources. In addition, in the environment of Southeast Asia, they often supplied a definitive answer to the question, "Where is the enemy?"

(S) Ground Reconnaissance Patrols. Ground reconnaissance patrols were one of the most widely used means of tactical intelligence collection. Close-in patrols reconnoitered as a protective measure against enemy build-ups and harassing mortar and rocket attacks on fire support bases and other semi-permanent positions. Long-Range Reconnaissance Patrols (LRRPs) usually operated at ranges between close-in defensive perimeters and the outer limits of friendly artillery fire fans. Special operations patrols were employed to gather intelligence from within the enemy's secret base areas and cross-border sanctuaries. The special patrol resources comprised MACSOG and CIDG Units, Road Runner, Road Watch and River Watch teams, and Provincial Reconnaissance Units (PRUs). MACSOG and CIDG assets operated within a joint and combined command structure. Road Watch, Road Runner and River Watch teams were drawn from this structure and were also provided through intelligence systems in Laos and elsewhere. PRUs were special assets of the Vietnamese Province Chiefs who employed them against enemy base facilities and the Viet Cong Infrastructure (VCI).

(C) Agents. Agents were developed and employed by virtually every ARVN, US, and other FWMAF unit that had an S-2 or G-2 section. In addition, every Vietnamese Province and District Chief employed agents as did the police and other special program elements. Agent nets were operated unilaterally by US military and civilian agencies, bilaterally by the US in cooperation with Vietnamese units and agencies, and unilaterally by the Vietnamese. Agent nets overlapped internal political boundaries and national frontiers. Maintenance of a central source registry and control system was the responsibility of the Vietnamese Military Security Service. Vietnamese citizens who occasionally volunteered information on the enemy were not usually included in the agent registry which was oriented toward paid agent and double agent control and to counterintelligence protection.

(C) Prisoner and Rallier Interrogations. Interrogations of captured prisoners and ralliers (Hoi Chans) were carried out at battalion, brigade, division, and at Vietnamese district, province and military region levels. Battalions had little capability for in-depth interrogations apart from assigned interpreters/translators. Brigade and division G-2 sections were augmented with IPW capabilities to acquire intelligence relevant to unit TAOIs.

(U) Prisoners and ralliers were properly a responsibility of the Vietnamese, and US units were required to pass them into the Vietnamese command chain at the earliest opportunity. Insertion could be made at any point, i.e., ARVN units, or Vietnamese district, province and regional centers. The centers were key points in the interrogation process. They were jointly staffed by US and Vietnamese interrogators operating within the Combined Military Interrogation Center (CMIC) structure of the Combined Intelligence Center, Vietnam (CICV).[3]

(U) Captured Documents. Translations of captured documents were important sources of tactical intelligence. Procedures and capabilities for document exploitation were similar to those for prisoner and rallier interrogation; i.e., minimal at battalion level and progressively better at succeeding, higher echelons. The Captured Document Exploitation Centers (CDEC) of CICV were the focal points for translation and dissemination of relevant intelligence to tactical units.

(U) Visual Aerial Reconnaissance. Visual aerial reconnaissance was a vital source of tactical intelligence. It was provided through a variety of means of which the most important were Air Cavalry patrols and airborne FACs. The unique role of FACs as gatherers of tactical intelligence is discussed separately above.

(C) Air cavalry reconnaissance assets were usually controlled by division G-2 and were allocated to subordinate echelons according to mission priorities. Two troops per division were the norm. Patrols roamed division TAOIs in random patterns using a low-bird (spotter) and high-bird (gunship) technique. In 1969, air cavalry reconnaissance assets were uniformly married with LRRP companies into airmobile combat ranger forces responsive to division G-3s.

(U) Army aviation, USAF, and VNAF pilots were auxiliary sources of tactical intelligence. Sightings of enemy movements and activities were regularly reported by them to the nearest friendly unit either directly, through the area FAC, or through other communications channels.

(U) Other HUMINT. Other indigenous HUMINT collection means employed for tactical intelligence purposes were Revolutionary Development

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[3] Cf. Chapter 4 and Appendix D.

(RD) Cadres and Census Grievance Teams. These assets worked for Province and District Chiefs. US tactical units had access to their output through the PIOCC/DIOCC system.

3.2 USEFULNESS OF COLLECTION MEANS

3.2.1 General

(U) The special nature of the Vietnam conflict prompted the deployment of a great variety of intelligence collection means. The usefulness of particular collection means varied greatly with the types of operations conducted, the areas of employment, and the emphasis given by commanders. As discussed in Chapter 2 on Needs, no particular collection means, either in the SENSOR, SIGINT, or HUMINT categories met all or most of the tactical intelligence collection requirements presented. What is clear is that the available means were most effectively employed in combination; and when considered as part of a total collection system, each functioned in a supplementary and confirming role. More importantly, the usefulness of the various types of collection means increased significantly when their informational output was timely and directly applicable to operational objectives.

(U) The main question regarding usefulness which this study attempts to answer is to what extent was each particular collection means useful in the planning and conduct of tactical operations. Other aspects of usefulness which were investigated were the availability of collection means at different echelons and the reasons why particular collection means were or were not used by individual commanders. The assessment of usefulness was made primarily on the basis of data compiled through interviews and completed questionnaires. Obviously, such data have inherent limitations. Opinions of commanders and staff officers about the utility of new and innovative sensor equipment introduced in their units in a combat environment were undoubtedly influenced by factors such as a lack of trained operators and maintenance personnel and inadequate orientation on the capabilities and limitations of the sensors. Other biases likely arise from the fact that many new equipment items were introduced in small numbers and without adequate provision for maintenance or replacement.

(C) Another factor affecting interpretation of interview and questionnaire results is that a generally low opinion of the utility of a particular collection means may not accurately reflect its availability or its performance in the field because of an organizational or procedural inability to process, analyze, and disseminate important intelligence outputs in a timely fashion to the combat echelon which needed them. The questionnaire used in this study attempted to distinguish between the availability, accuracy, and timeliness of output from particular collection means, but some respondents chose not to complete the portions wherein these distinctions were made. Given these limitations, the following sections present a qualitative and, where possible, quantitative ranking of the perceived usefulness of intelligence collection means to tactical commanders as derived from interviews, questionnaire results, and documentary sources.

3.2.2 General Findings

(U) Table 3.6 presents in summary form the qualitative findings of the case studies and the quantitative analysis of the interviews and questionnaires concerning the usefulness of different collection means.

(S) HUMINT collection means were held in general high regard. This is especially true for assets which were under the direct control of tactical commanders, or which were directly responsive to them such as air cavalry, FAC, and units in contact. Other HUMINT means such as prisoner and rallier (Chieu Hoi) interrogations and agent reports were rated as almost always useful even though they were often untimely in terms of current enemy unit locations and were also frequently inaccurate. Commanders evidently valued these sources highly because they had ready access to them and believed they could assess source credibility in a satisfactory manner. MACSOG was not highly valued as a collection means because of a general (and perhaps appropriate) lack of access to its reports at the operational level in both ground and air operations.

(S) SIGINT means had perceived value to tactical commanders in almost direct correspondence to the time and echelon of their service in Vietnam. At the MACV, 7th AF, Field Force and Division levels, commanders

Table 3.6 (C)

USEFULNESS OF COLLECTION MEANS (U)

			MF	I	P
HUMINT	GROUND PATROLS	MACSOG	2	2	2
		LRRP (US)	2	NA	2
		UNITS IN CONTACT	1	NA	2
		OTHER FRIENDLY	2	1	1
	AIRBORNE OBSERVATION	AIR CAVALRY	1	NA	2
		FAC	1	1	1
		OTHER VISUAL	3	1	3
	INTERROG.	PRISONER (IPW)	1	1	1
		RALLIER (CHIEU HOI)	1	1	1
	AGENTS	UNILATERAL (US)	1	1	1
		GVN (PIOCC/DIOCC)	NA	NA	1
SIGINT	SIGINT	COMINT	2	2	2
		D/F	1	2	2
		ELINT	3	1	3
SENSOR	GROUND	UNATTENDED (UGS)	NA	1	2
		SURV. RADARS	3	NA	2
	IMAGE INT.	LLTV	2	2	2
		STARLIGHT SCOPE	3	2	2
		NOD (ACTIVE/PASSIVE)	2	1	2
	AIRBORNE	SLAR	2	2	3
		IR	3	2	2
		BLACK/WHITE PHOTO	2	1	1
		SNIFFER (APDS)	2	NA	2

Key:

1 = Always 2 = Sometimes 3 = Never NA = Not Applicable

MF = Main Force
I = Interdiction
P = Pacification.

and intelligence officers valued SIGINT very highly indeed. Commanders at lower tactical levels in both ground and air interdiction operations generally had less direct access to SIGINT and, especially in the early years, frequently did not receive SIGINT reports rapidly enough to permit the taking of direct and useful action. Tactical commanders who served during the later years of the war when ASA DSU reports were passed to them at the same time as they were sent upward were, however, generally more appreciative of the usefulness of this collection resource.

(S) Sensors appear to have been valued primarily when they had a relatively low false alarm rate and when they were coupled directly to a strike system. This was true of ground radars and unattended sensors in defense of bases, camps, and other installations. It was also true of night vision aids used in gunships in the interdiction operations, and of the airborne "sniffer" in air cavalry hunter-killer operations. The special value of photographic reconnaissance and of the Igloo White UGS system in planning, targeting, and evaluating air interdiction operations was uniformly recognized.

(U) The following sections of this chapter discuss the principal factors affecting the usefulness of individual collection means as analyzed from the results of responses to the questionnaire, interviews, and the case study experience described in Appendixes A, B, and C.

3.2.3 Sensors

(S) Radars/Ground Surveillance. The TPS-25 and PPS-5 (Table 3.1) both proved to be primarily useful as early warning, anti-intrusion devices in base defense. Typically, the average elapsed time from event to receipt of report was 15 minutes. The TPS-25 was generally more useful because it could detect movement which the PPS-5 with much less average power could not. However, agreement on the usefulness of ground surveillance radars is mixed as much depended on the degree of motivation and skill of their operators as well as on the relative difficulty of maintaining them at outlying FSBs. Also, as several commanders indicated, instead of only one or two in the division, there may have been a requirement for one radar for each battalion, or each FSB, providing each radar had a well-trained operator.

(C) Radars/Foliage Penetration. One major operational drawback of foliage penetration radars was the requirement for large antenna heights (100 feet) for effective operations; i.e., the radar as presently designed must look down upon the surrounding foliage rather than out through it. This requirement turned radar sites into distinctive landmarks that could be used to the benefit of attacking enemy forces. Another major problem with this equipment as with other MTI radars was its susceptibility to false alarms.

(C) Radars/Counter-Mortar. The AN/MPQ-4A mortar locating radar, a standard item in US Army artillery units was only occasionally effective against mortars and seldom effective against artillery and rockets. Because of the latter's ranges and flatter trajectory, the dual-beam AN/MPQ-4 was an unsatisfactory weapon locator in Vietnam.

(S) Radars/Airborne Side Looking (SLAR). A majority of the commanders surveyed agreed that the airborne side looking radar, APQ-102 in the RF-4C had very limited usefulness in tactical operations primarily because of the lack of an in-flight readout capability. The average elapsed time from event to receipt of hard copy report was typically 12 hours, which is unacceptable for tactical targeting. To this time must be added the time covering the period between the initiation of a request and the occurrence of the event. The AN/APS-94C system in the OV-1 Mohawk found more use because it had a limited in-flight readout capability, but only against rapidly moving vehicles in areas producing significantly little ground clutter. This system could be coupled to a Ground Sensor Terminal (GST) for near, real-time data transmission and processing. Interview and case study results show, however, that usefulness varied with availability of GST facilities as well as with vegetation and terrain factors. With respect to the latter, the system was less useful over heavily jungled areas and more useful over open terrain. The system proved particularly useful in detecting logistics watercraft activity off the lower coast of North Vietnam during periods of low cloud cover. In all cases of OV-1 application, results were generally employed in developing pattern analyses.

(C) In response to the increasingly elusive tactics of the enemy following the 1968 Tet Offensive, some ground commanders experimented with procedures for using the Mohawk system for immediate reaction (recce/strike) without full knowledge of the equipment capabilities and limitations. Because of the demanding nature of the recce/strike process, and the limitations of the real-time, on-board displays (they were intended as monitoring devices and not as targeting displays) less than satisfactory results were obtained.

(S) <u>Infrared Systems/Airborne IR</u>. Airborne infrared systems were generally considered only moderately useful insofar as they always contributed to pattern analysis, as in War Zone C, but were of little use in satisfying immediate needs. The RF-4C IR equipment found very limited use in in-country tactical operations, owing primarily to the requirement for post-flight film processing at Tan Son Nhut. An out-of-country operation was used for fire detection, bomb damage assessment, and the generation at night of continous terrain imagery for the detection of bridge damage, road bypasses, vehicle and boat locations, etc. Detection of "hot spots" when followed by photo missions for identification was often effective.

(C) A principal problem in using IR systems in a target acquisition role was the same as with SLAR discussed above. Other inherent IR scanner problems were the existence of false alarms from friendly indigenous populations when the equipment was used to detect enemy cooking fires, and the inability of IR to penetrate heavy foliage. Additional problems were related to the equipment itself: maintenance; limited angular resolution; and minimum detectable temperature difference characteristics.

(S) <u>IR Systems/Airborne FLIR</u>. Forward looking IR devices were deployed in the Air Force Gunship Program, the Army UH-1 helicopter and the Marine Corps YOV-10D. Tests of all three systems in Vietnam produced very satisfactory results. The AAD-4 FLIR mounted in the AC-130 Gunship II and introduced in Vietnam after initial tests at Eglin AFB in 1967 proved very effective in the detection of trucks at ranges in excess of 6000 ft. Some former commanders have suggested that the AC-130 Gunship with the FLIR was perhaps the most effective weapon in the night interdiction role. The success of the Gunship II Program led to a program for a family of AC-119G, AC-119K, and AC-130 Gunships. For main force and pacification operations, FLIR was successfully tested as a day and night reconnaissance system. Significant problems were, however, encountered with maintenance owing to an inadequate supply of spare parts in-country.

(C) Airborne Personnel Detection System (APDS) (Sniffer). Most interviewees and documentary sources agree that the APDS was of limited utility because of maintenance problems and high false alarm rates. The APDS is affected by weather, lacks spatial and temporal resolution, and requires careful control of aircraft flight patterns to avoid false alarms from aircraft exhaust. The most successful results were reported by the US 9th Division where sniffers were teamed with air cavalry reconnaissance and armed helicopters in hunter-killer operations.

(C) Electro-Optical Systems/LLLTV. LLLTV was assessed as having little usefulness in ground operations primarily because of its very limited range under most night combat conditions. Air commanders, however, found the LLLTV tracking/firing system in the AC-130 Gunship most useful. The great majority of truck kills achieved at night by the AC-130 Gunships were attributed by some commanders to the effectiveness of this system. Data acquired in this study, however, are insufficient to measure the difference in usefulness between the FLIR and LLLTV systems in the AC-130.

(C) Electro-Optical Systems/NOD. Interviewees and documentary sources agree that the Night Observation Device (NOD) was too large and heavy to find much use in offensive ground tactical operations in Vietnam, but did find use in night defensive work at fixed observation posts. The NOD has a limited range in the passive mode and was more effective when used with a separate illuminator (a searchlight filtered to pass near infrared wavelengths). This latter mode was limited by back-scatter under adverse weather conditions. The NOD with and without a stabilized mount had some early effectiveness as a night recce-strike sensor in both armed helicopters and gunships but was displaced in this role by the FLIR when it became available.

(C) Electro-Optical Systems/Starlight Scope. The Starlight Scope was used extensively in offensive and defensive night operations. It was particularly effective when utilized by ground troops in ambush along trails at night. It also found extensive use in aerial night reconnaissance and was particularly effective in helicopters and FAC aircraft except that reflectance from the aircraft canopies was a problem particularly in the OV-10.

(S) Unattended Ground Sensors/UGS. The use of Unattended Ground Sensors (UGS) in the Igloo White system for monitoring the road network in the Steel Tiger area in Laos is described extensively in Appendixes C and D. The Igloo White system matured between 1969 and 1971 and proved to be of great utility in estimating logistic activity on the road network, in planning reconnaissance missions, in targeting for Arc Light missions and strikes against night movers and, with acoustic sensors, for determining site occupancy and achieving indirect BDA.

(S) UGS were utilized in ground operations in different regions with varying success. In MR I, sensors were employed extensively in acquiring targets for artillery and tactical air strikes in remote areas and along infiltration routes. Sensors were monitored via an airborne relay at a combined US/ARVN sensor operations center at Quang Tri. In MRs II, III, and IV, UGS were generally successful after 1969 where they were employed for artillery target acquisition in defense of fire-bases and camps. Problems of high false alarm rates and inadequate target discrimination were, however, frequently encountered. In general, ground commanders who emphasized the use of UGS and paid proper attention to deployment and interpretation of activation signals believed UGS to be an important intelligence collection system. Clearly, however, unattended sensor systems did not achieve organizational and operational maturity in ground operations in Vietnam.

(S) Photography/Photo-Recce. Photographic reconnaissance was used intensively in Southeast Asia throughout the war, perhaps more intensively and on a larger scale than ever before. Two USAF tactical reconnaissance wings were largely devoted to Photo-Recce along with strategic platforms, Navy carrier-based reconnaissance aircraft, Marine Air

Wing assets, Army Mohawks, and FACs with hand-held cameras. Tactical commanders in ground and interdiction operations particularly valued the timely reconnaissance and BDA provided by the last-named source. Planned photographic reconnaissance had a built-in delay in mission execution because of home-base processing and interpretation requirements; weather conditions were also a source of delay. Photo reconnaissance was, of course, the primary intelligence source for planning daylight bombing and for BDA in the infiltration operations in Laos. A major problem existed with the analysis and interpretation of photographic imagery, both because of the sheer magnitude of the task and the real difficulty in distinguishing targets in areas of heavy cover where camouflage and deception were extensively practiced by the enemy.

3.2.4 SIGINT

(S) Almost without exception tactical commanders agreed that SIGINT was a vital source of combat intelligence. Agreement was especially strong at the highest levels of command. In air and ground operations, lower level commanders, whose dominant need was targeting of units, camps, and installations in near real-time found RDF reports of greatest use since COMINT derived from traffic analysis performed at corps and higher headquarters reached them only after a considerable delay, if at all, and was therefore most useful at division and higher levels. ELINT was of value primarily in verification of SAM site locations in the interdiction campaign.

(S) There is no doubt that COMINT and RDF were of primary value for ground operations in determining changes in enemy unit dispositions and in tracking movements of VC and NVA unit headquarters. No other source was more valuable for this information which was critically needed for planning major operations and for warning of major enemy attacks.

(S) Use of SIGINT for targeting was hampered by the fact that in most of the early period, DF reports were not directly passed to battalion and brigade headquarters but were instead relayed to corps level Collection Management Authorities (CMA) for analysis and later dissemination. Commanders at battalion, brigade, and division were bitterly critical of this early practice. In later years when direct support units (DSUs) directly passed DF information to supported units, a more effective utilization resulted. Even so, enemy countermeasures hindered utilization of SIGINT for targeting of ground operations or air strikes. Interviewed officers and documentary sources show that VC and NVA units commonly operated radios well removed (4-6 km) from served units, frequently moved radio sites, and practiced deception.

3.2.5 HUMINT

(U) Ground Reconnaissance Patrols. Ground reconnaissance was one of the most effective means of acquiring timely tactical intelligence. Patrol utility varied widely, however, with mission needs, types of operations supported, and availability of the many different kinds of patrol resources at different levels of control.

(S) MACSOG deep-penetration patrol reports were highly valued by national military command authorities and by planners of air interdiction strikes on enemy bases in remote War Zone and sanctuary locations. Lower echelon tactical commanders, however, had little direct access to MACSOG reconnaissance reports even when required to support MACSOG operations with airlift and gunships. Interview data suggest that division, brigade, and battalion commanders believe the effectiveness of their operations against enemy Main Forces might have been increased with the benefit of MACSOG intelligence on enemy dispositions in and near their TAOIs. There is, however, no practical way to test this belief. This is not to say that the problem of tactical echelon access to MACSOG-type intelligence cannot or should not be investigated.

(S) Amongst former commanders and staff planners who had access to MACSOG intelligence, three major deficiencies have been observed: (1) estimated locations were typically 500 meters off from true locations; (2) patrol effectiveness decreased sharply with increased enemy strength in reconnaissance zones; and (3) patrols comprised entirely of indigenous personnel tended to perform less effectively than patrols led by US personnel.

(S) There is little doubt that MACSOG patrols lacked adequate capability to obtain accurate fixes on their own locations from which they estimated the locations of enemy positions. In the absence of accurate position data and also with frequently imprecise determinations of azimuths, target boxes for B-52 raids were sometimes laid out either parallel or at sharp angles to enemy base positions. With respect to the low-rated effectiveness of indigenous personnel, the issue remains unclear. Reports of armored vehicles and heavy artillery infiltration were often discounted when other intelligence sources offered no confirming evidence, and yet such reports almost invariably proved true later on under surprise conditions.

(C) Long Range Reconnaissance Patrols (LRRPs) enjoyed mixed success. They were generally useful to verify other reports of enemy build-ups in outlying areas, and to assess bomb damage after B-52 raids within division TAOIs. LRRPs were less useful for detecting infiltration and enemy tactical maneuvers in areas where movement was not channelized by terrain. Where the enemy's avenues of movement were restricted, a few well-placed sensor strings ultimately provided continuous coverage with less commitment of unit resources.

(C) LRRP value was further degraded in the opinion of many commanders by their slow rate of movement relative to the large expanses of territory to be reconnoitered and by their constant need for a standby protective reaction force which could have been usefully employed in another capacity. These reasons contributed to the eventual decision to convert LRRPs to combat ranger formations which operated in conjunction with Air Cavalry troops under G-3 control.

(C) Tactical intelligence reports from CIDG, ARVN, RF/PF and other friendly ground reconnaissance and combat assets operating within division, brigade, and battalion TAOIs were regarded as very useful by tactical commanders. Similarly in interdiction operations, reports from Lao regular and irregular forces often contributed significantly to targeting. Such reports frequently lacked timeliness, however, and were therefore more useful for planning future operations than for immediate response decision-making.

(U) Units in contact were always useful sources of tactical intelligence mainly because they were both timely and accurate. Contact with the enemy's main forces confirmed their presence at a known location and offered opportunity to develop the situation into a decisive engagement. In pacification operations, reports of contacts could often be exploited rapidly in coordination with ARVN and RF/PF assets through the DIOCC/PIOCC system.

(C) Airborne Observation. Tactical commanders regarded Air Cavalry reconnaissance patrols most highly for their ability to find the enemy. Indeed, a majority of commanders in interviews and responses to the questionnaire survey rated Air Cavalry as one of the most useful collection assets available to them. Initially, Air Cavalry reconnaissance was a daylight activity but experimentation with a variety of illuminators, aids to night vision, and sensor devices in Army aircraft soon led to the widespread use of Air Cavalry in night hunter-killer operations. For daylight operations, Air Cavalry resources were married in 1969 with LRRP units in combat ranger formations capable of finding and engaging the enemy without delay.

(C) Spot intelligence reports from FACs were uniformly held as always useful to operational commanders in the three types of operations studied. The high usefulness of FACs was based on their deep familiarity with specific AOs and their corresponding ability to detect changes in the landscape. In high threat areas, slow moving FACs were more vulnerable to enemy fire and therefore somewhat less effective. However, F-100 and F-104 "Misty" and "Wolf" FACs proved as effective as the slow movers. Photographs taken by FACs and other airborne observers with hand-held cameras were especially useful to tactical commanders and staff planners even though they lacked the clarity and resolution of more sophisticated photographic means. They had the decided advantage of timely availability.

(C) Interrogation Reports. Prisoner and rallier interrogation reports were always useful to tactical commanders. Even when such reports lacked timeliness, as was often the case, they contributed substantially to the operations planning process. Reports varied in quality with the skills of US and Vietnamese interrogators and with the kinds and amounts of detailed information known to the interrogees.

(C) The augmentation of ground division IPW sections with MI-trained, Vietnamese interrogators markedly improved the quality and timeliness of intelligence gathered from prisoners and ralliers in main force and pacification operations. At higher echelons, in-depth interrogations produced other intelligence which, in the hands of trained CICV analysts, materially contributed to command knowledge of the enemy's infiltration and support system including out-of-country LOC alignments and throughput capacities.

(C) Agent Reports. Agents were a major source of tactical intelligence for US, ARVN, and other FWMAF. They were employed in-country and cross-border through multiple and overlapping nets that defied effective administration. The value of agent reports to US tactical commanders and planners appears related to whether the agent sources were directly responsive to US control. Reports from agents controlled by GVN elements were regarded with skepticism and were low-rated by US commanders for main force and cross-border interdiction operations. Whether this finding from questionnaire and interview results is owing more to a timeliness factor or to a presumptive bias of greater credibility of agents subject to US control merits further investigation.

(C) In pacification operations, however, agent reports from GVN sources processed through the PIOCC/DIOCC system were regarded as one of the most useful means available. Information voluntarily given by Vietnamese citizens, although often lacking timeliness, was also useful and was, moreover, taken as a key indicator of success in pacification.

(C) Document Exploitation. The overall value of captured documents for tactical operations was low owing primarily to the perishable nature of enemy operations orders and plans and the inability of capturing echelons to exploit them for immediate tactical advantage. In some instances the sheer volume of documents captured precluded effective exploitation at tactical command levels; a corps of trained analysts with acquired language translation skills was essential for this process. In time, CICV effectively met this requirement through the Combined Document Exploitation system.[4]

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[4] Cf. Chapter 4 and Appendix D.

4 INTELLIGENCE ORGANIZATION AND MANAGEMENT (U)

4.1 INTELLIGENCE ORGANIZATIONS AND PROCEDURES

4.1.1 Evolution of Tactical Intelligence Systems

(U) In early 1965 when US ground combat forces were introduced into Vietnam in augmentation to the US advisory and combat support elements already assisting the Republic of Vietnam Armed Forces (RVNAF), the existing tactical intelligence systems were geared only to RVNAF needs and capabilities, and to the essentially advisory role which US personnel had filled vis-a-vis the Vietnamese Joint General Staff (JGS). In sum, the "systems" were not designed and had little capability to meet the instantaneous needs of US combat units for detailed information on enemy force strengths, dispositions, capabilities, and intentions.

(U) As the conflict for control of the South evolved from 1961 to 1965, the GVN, with US advice, sought to contain and defeat it with minimum application of force at provincial levels. GVN Province Chiefs, who were usually Army field-grade officers, bore primary responsibility for the defense of their provinces and the security of the population. Province Chiefs commanded the Regional and Popular (territorial defense) Forces (RF/PF), which were the basic instruments of hamlet, village, and lines of communication security. The regular forces of the Army of the Republic of Vietnam (ARVN), Vietnamese Marine Corps (VNMC), Vietnamese Navy (VNN), and Vietnamese Air Force (VNAF) had the assigned roles of backstopping the RF/PF against the enemy's main maneuver forces, and preventing enemy infiltration across the country's long and exposed land and sea frontiers. RVNAF combat operations were controlled through four Corps Tactical Zone (CTZ) commands later to become Military Regions (MR), to whose headquarters the Province Chiefs reported on military/security affairs. National supervision of combat operations was exercised by the JGS both through the CTZ command structure and through the RVNAF service commands.

(U) US military personnel advised, assisted, and supported the GVN regular forces, territorial defense forces and organized civilian irregulars through a multitude of advisory detachments. Their activities were operationally controlled and coordinated by MACV through an administrative command structure which embraced the operational control of US combat support and combat service support units in addition to the advisory detachments.

(U) The MACV advisory system replicated the RVNAF military and GVN civilian command structures to the extent that US military advisors were assigned to the regular forces down to battalion level, and to the territorial defense and irregular forces down to district level. Owing mainly to superior training and communications capabilities, the US advisory chain of command was in many regards more responsive than the corresponding Vietnamese system, especially insofar as the passing of tactical intelligence up, down, and across the different command chains was concerned. This is not to say that the intelligence which passed through the US advisory system was superior to or more accurate than intelligence independently acquired by the Vietnamese and processed through their systems: it is to say only that to the extent that the same information entered both the US and Vietnamese systems simultaneously, it usually moved through the US chain with much greater speed and with wider dissemination to all US elements whose security and/or operational support activities might be affected.

(U) As the buildup of US combat forces continued, and as they assumed the major burden of combat operations from the RVNAF and especially the ARVN which had been on the verge of collapse in many parts of the three northernmost CTZ, the need for quantum improvements in tactical intelligence acquisition, processing, evaluation, and dissemination became imperative. There were innumerable problems. The decimation of ARVN battalions had reduced the flow of intelligence from them and from the US advisors assigned to them. US combat forces were anxious to move quickly against known enemy strongholds (e.g., War Zones C and D, and the Iron Triangle) but information in sufficient detail for the planning of major operations was almost totally lacking. Special operations together with reporting from province (Sector) and district (sub-Sector) advisory teams offered some hard data on enemy activities and capabilities in remote base and sanctuary areas, but was inadequate to the needs of the newly arrived US combat forces.

(U) The intelligence effort had to be built on the existing base; there was no other way. The US committed its forces to Vietnam to assist and not to displace the GVN. The requirement for MACV therefore was to transform what had been only an advisory relationship with RVNAF intelligence components into a combined operational intelligence system in which US and Vietnamese personnel would participate on equal terms. It was not an easy task. Language and cultural differences were obvious obstacles to success in melding US and Vietnamese personnel for collection, processing, analysis, and dissemination of intelligence. Beyond these lay a welter of other problems concerning command relationships within the US and RVN intelligence structures and between them as well, different perceptions of needs and priorities, political constraints that had their origin in the US decision to respect on the ground a number of US map-designated, international boundary lines which held no significance to the enemy, and a variety of resource constraints which were associated as much with the rate at which the command could accept and apply additional intelligence assets as with their availability from PACOM and CONUS.

(U) Problems and obstacles notwithstanding, the process of building an intelligence system responsive to the needs of US, RVN, and other Free World Military Assistance Forces (FWMAF) went forward under the direction of US Army MG Joseph A. McChristian who assumed the position of ACofS, J-2 MACV in July 1965. The ultimate result was a Combined Intelligence Center (CICV) with separate components responsible for prisoner and rallier interrogations, captured document exploitation, captured material exploitation, and intelligence production (see Figure 4.1).

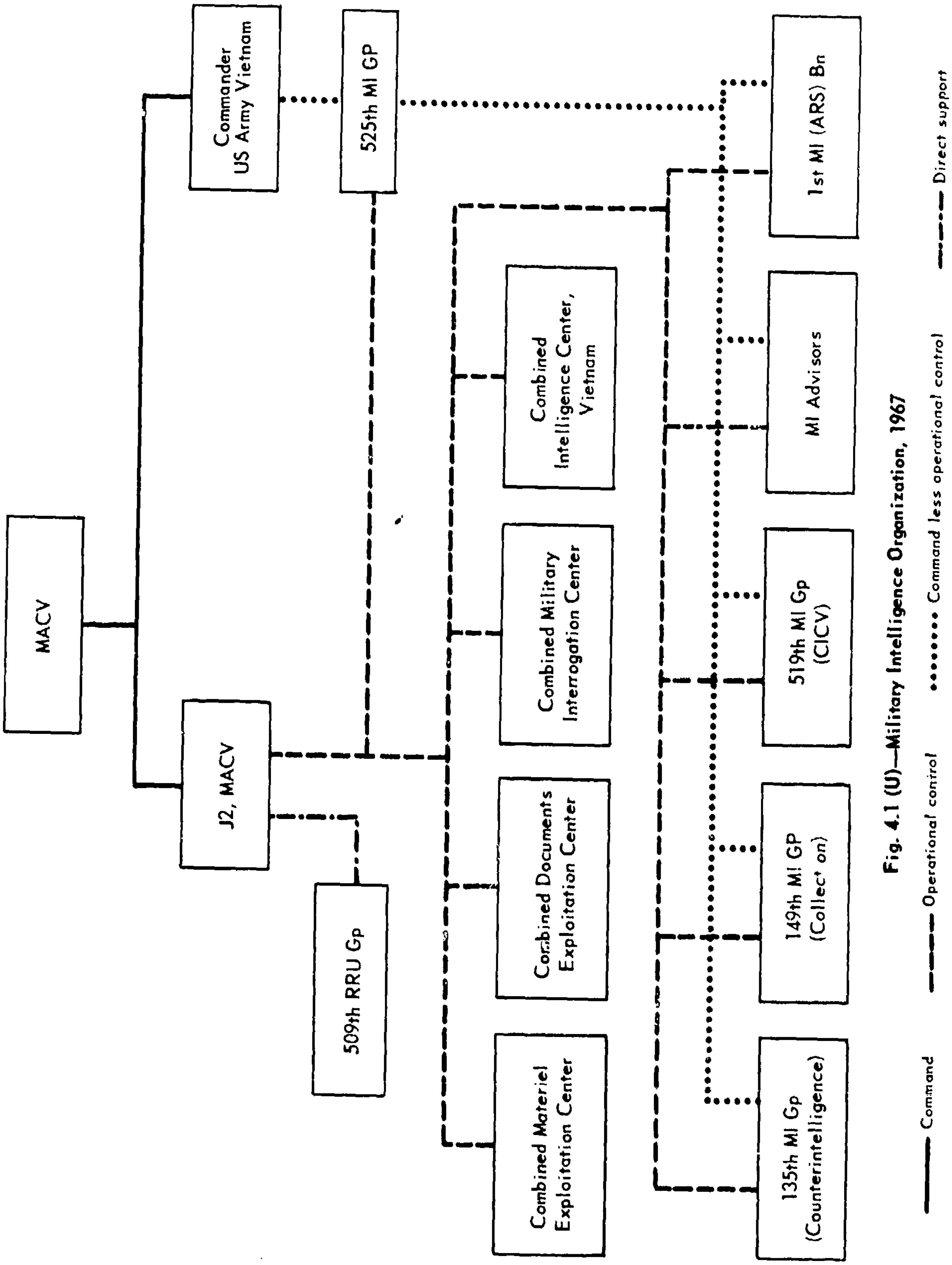

Fig. 4.1 (U)—Military Intelligence Organization, 1967

The combined intelligence center initially embraced only the US and RVNAF commands but was soon enlarged by formal agreements to serve the combat intelligence needs of Korean, Thai, Australian, and New Zealand forces as they arrived in country and took on operational responsibilities. In time, the combined intelligence operations concept was extended to tie in the collection, evaluation, and dissemination activities of US advisors, and GVN military commanders and civilian officials in all of Vietnam's CTZ's provinces and districts. The effectiveness of Vietnamese participation at these lower levels was, however, limited in comparison to the US by inferior assets except insofar as HUMINT sources and operations were concerned. Here, the Vietnamese were able to excel for obvious reasons of ethnic, cultural, and language identities.

(C) The process of extending and implementing the combined intelligence concept evolved slowly, however, and it is somewhat surprising that this was the case inasmuch as it of necessity built on the advisory system which was well-established in 1965. In II CTZ, for example, a combined military interrogation center was not established until early 1969.[1] The reluctance of some senior ARVN commanders to implement the concept and, in effect, make their American and other allied counterparts privy to information which they possessed, may have been a reason.[2]

4.1.2 The CICV Structure

(C) The heart of the combined intelligence effort was the CICV and its associated interrogation, document, and materiel exploitation components. Figure 4.2 depicts the organizational structure. The component elements of CICV were eventually replicated at the headquarters of each of the four CTZ. US military intelligence personnel manned these centers in combination with Vietnamese counterparts.

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[1] Cf. US Army Adjutant General, "Senior Officer Debriefing Report by BG John W. Barnes, DSA IICTZ for Period 18 November 1967-15 December 1968 (U). FOR OT UO 68B027; Incl 2, CONFIDENTIAL.

[2] Interview data.

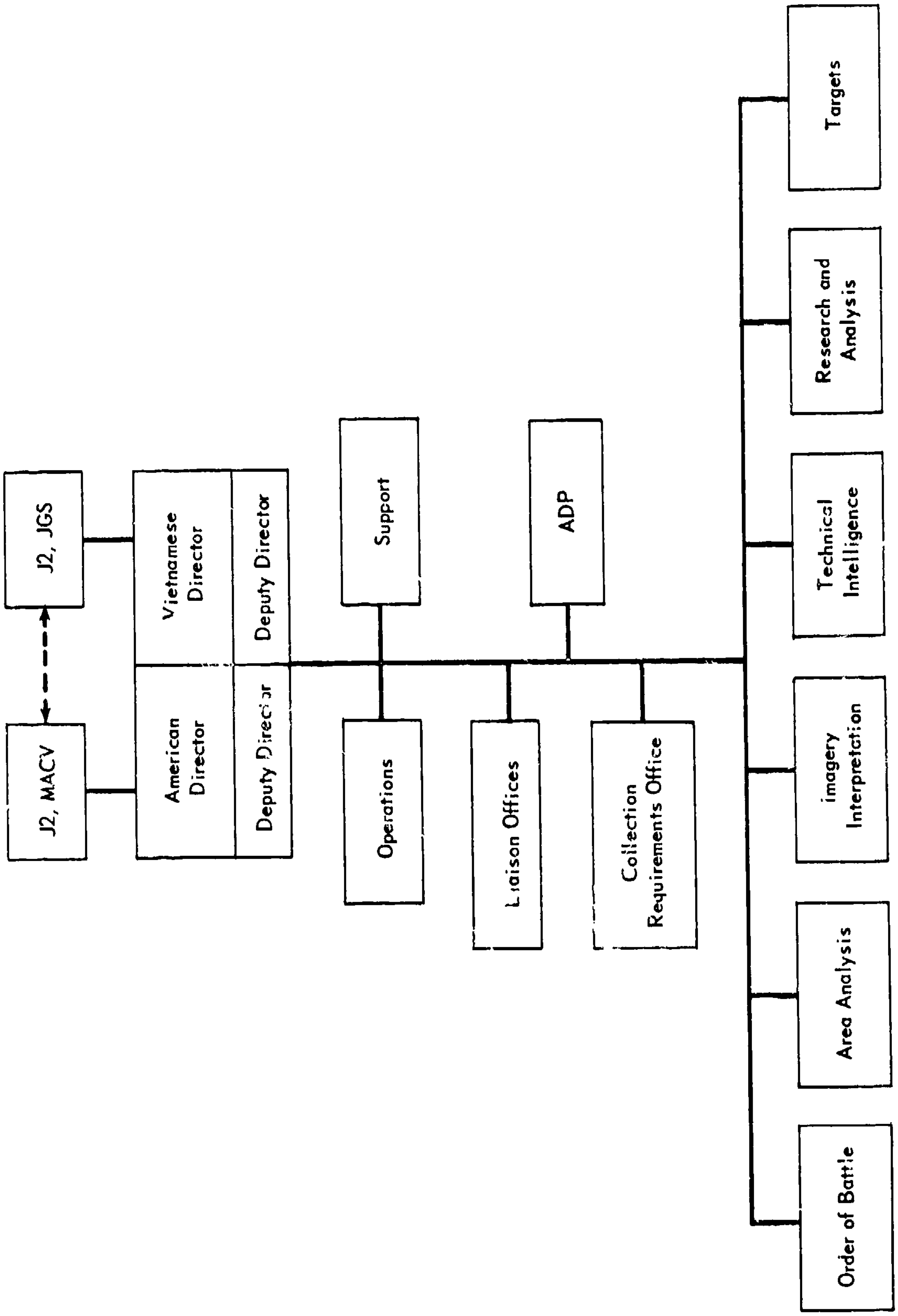

Fig. 4.2 (U)—Organization-Combined Intelligence Center, Vietnam (CICV)

——— Command　　– – – – Coordination

(S) US personnel were initially assigned to CICV from the 135th (Counterintelligence), 149th (Collection), and the 519th MI Groups. Army Security Agency support was provided by the 509th RR Group and subordinate elements. In December 1967 the 135th and 149th groups were absorbed by the 525th MI Group, and the 519th was redesignated the 519th MI Bn (FA). The 525th group continued to support the combined intelligence centers with approximately 800 intelligence specialists organized into six provisional battalions.[3] Five of these battalions were in direct support in the CTZs and the Capital Military District. The sixth was tasked to conduct unilateral clandestine operations.[4] Counterpart Vietnamese personnel were drawn from the 924th Support Group and the Military Security Service (MSS).

(U) CICV and the other three combined intelligence centers played a major role in the "Vietnamization" of the intelligence effort. They became excellent on-the-job training centers for RVNAF intelligence personnel. As US troop strength declined in Southeast Asia after 1969, South Vietnamese personnel gradually assumed more responsibility with less assistance from US counterparts. Following the phase-out of US military personnel, CICV was maintained by the RVNAF as a Joint Intelligence Center.

4.1.3 Support to Tactical Units

(U) US and other allied combat forces arrived in Vietnam with their organic intelligence capabilities but with little knowledge of the operational environment or of the enemy's force dispositions. CICV was the major resource for help. Division requests for aerial photography required organizing and flying the missions, analyzing the imagery and

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[3] US Army Adjutant General, "Operational Report Lessons Learned, Hq 525th MI Group Period Ending 31 October 1970 (U)," AGDA-A(M) (21 Apr 71) FOR OT UT 704213, 14 May 1971, CONFIDENTIAL; ________, "Period Ending 30 April 1971, (U)," AGDA-A(M) (3 Sep 71) FOR OT UT 711131, 23 September 1971, CONFIDENTIAL.

[4] William G. Benedict, et a., A Critical Analysis of US Army Intelligence Organizations and Concepts in Vietnam, 1965-1969, (U), Carlisle Barracks, Penna: US Army War College, 1971, p 77f, SECRET/NOFORN.

creating mosaics from it.[5] This process took time and often a division's needs had passed before the results were available. Translations of captured documents, interrogations of prisoners and analyses of captured materiel were performed more quickly, often overnight, with the results made available in time to influence operations planning a day or so later.[6] This was also too slow for the quick tempo of the planning and operations cycle. The enemy seldom stayed in place that long. The divisions needed a shortened response time. MACV-J2 undertook to reduce the time required by, in effect, reversing the advisory process.

(U) Beginning in January 1966, under a formal agreement, South Vietnamese military intelligence detachments were assigned to US divisions and separate brigades. Because of the shortage of trained Vietnamese intelligence specialists only reduced-strength detachments were made available at the outset, but emphasis was placed on interrogators and documents analysts.[7] Later, order of battle and imagery interpretation specialists were added as they became available. The augmentation of division G-2 staffs with Vietnamese interrogators and document translators did much to improve division capabilities to exploit intelligence of tactical value on a more timely basis.[8]

(S) Between 1969 and 1973, MACV-J2 and J2 JGS RVNAF initiated other actions to improve timely support to combat commanders. Captured documents were transported by air from point of acquisition to the Combined Document Exploitation Center and translated overnight. Results were returned immediately after daylight the following morning. Important findings were dispatched via the greatly improved communications system during the night if appropriate and required. Direct support SIGINT units were placed with each ARVN and US division, and separate brigade to ensure the fastest possible receipt of perishable intelligence.

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[5] US Army, Office of the Chief of Military History, History of Army Intelligence, Ch VI, "MI Comes of Age (1963 to the Present)," p 110, UNCLASSIFIED (Unpublished Manuscript).

[6] Ibid.

[7] MG Joseph A. McChristian, The Role of Military Intelligence 1965-1967, Washington: OCMH(DA), 1974, p 24, UNCLASSIFIED.

[8] Ibid, p 25f.

(C) Aerial Reconnaissance Support. Tactical aerial reconnaissance support was provided by Army and USAF assets. The Army assets were embodied mainly in the OV-1 (Mohawk) surveillance system. The Mohawks were deployed country-wide through five Surveillance Aircraft Companies of the 1st Aviation Brigade.[9] The Air Force assets (RF-101, RF4C, RB57, RC47) were assigned to the 460th Tactical Reconnaissance Wing of the 7th Air Force and the 432d Tactical Reconnaissance Wing at Udorn.[10] All Air Force missions flown from Tan Son Nhut or Udorn were processed through the MACV Joint Combat Operations Center, and the 7th Air Force Tactical Air Control Center (see Figure 4.3).[11] Mohawk missions, on the other hand, were allocated and controlled at corps level, i.e., I and II Field Forces, III MAF and IV CTZ Senior Advisor.[12] Army tactical commanders, when requesting aerial reconnaissance, were free to specify Mohawk in all but I CTZ where III MAF reserved the right to determine the system most appropriate to the mission.[13] Elsewhere, fixed numbers of Mohawk sorties were allocated to subordinate commands on a daily basis.

4.1.4 Role of Civilian Intelligence Agencies

(C) Civilian intelligence agencies in Vietnam contributed to the flow of tactical intelligence mainly through their advisory relationships with the Vietnamese police, province and district chiefs, and programs targeted on the Viet Cong Infrastructure (VCI). Some recent studies have severely criticized civilian intelligence agencies for failure to coordinate effectively with the US military.[14] The criticism may be

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[9] Benedict, op. cit., p 139, CONFIDENTIAL.
[10] McChristian, op. cit., p 97ff.
[11] Ibid.
[12] Benedict, op. cit., p 139.
[13] Ibid.
[14] Cf. Benedict, op. cit., p 80ff.

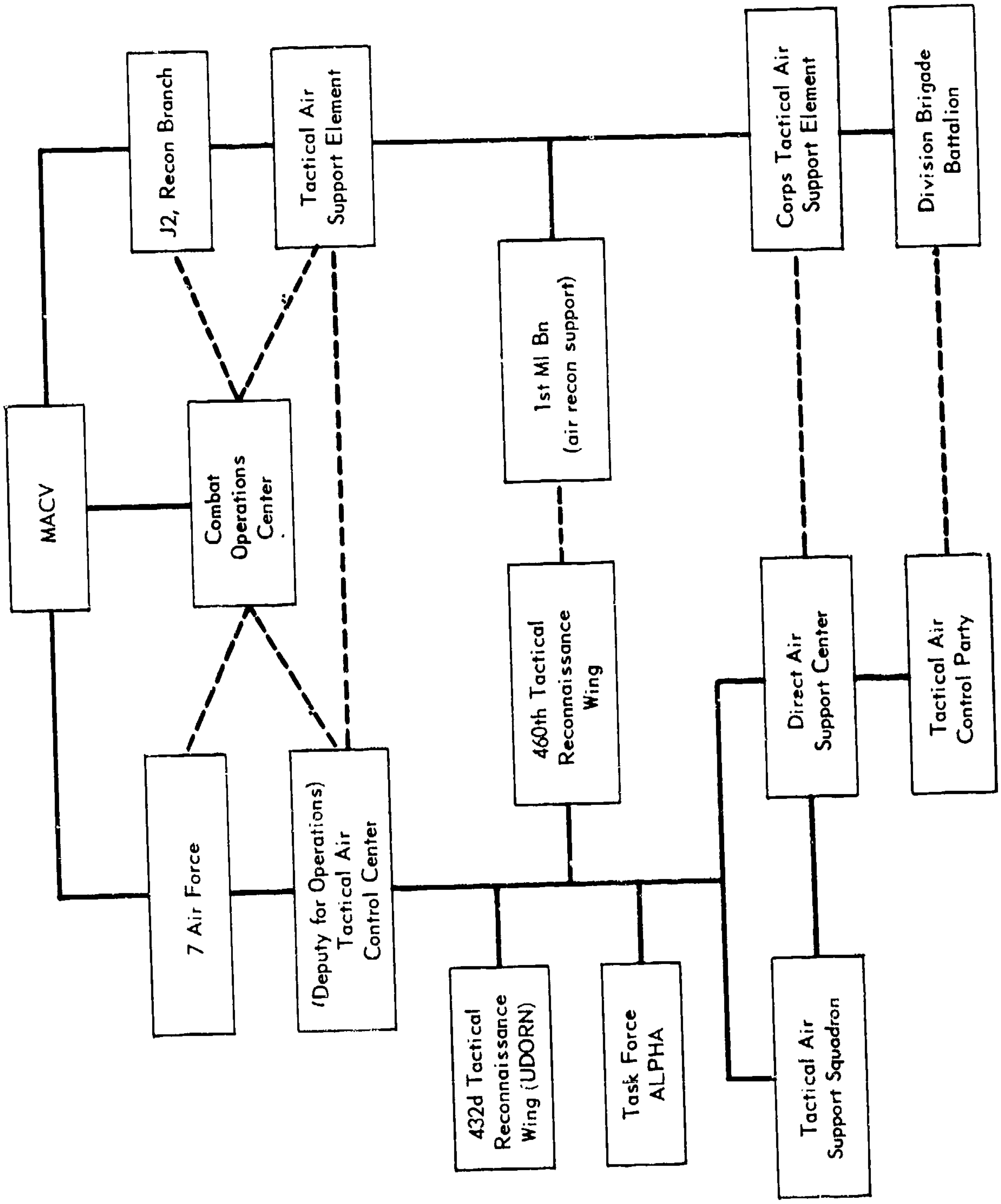

Fig. 4.3 (U)—Organization for Tactical Air Reconnaissance and Targeting

—— Operational control ---- Coordination partially deserved but it must be borne in mind that civilian agency intelligence specialists continued to operate in an advisory capacity vis-a-vis their Vietnamese counterparts whereas US military personnel had the advantage of command authority in some instances under the combined military intelligence program. US MI specialists interfaced with civilian agency specialists in the Phoenix program against the VCI. Intelligence generated by Vietnamese assets at district and province was integrated at the DIOCCs and PIOCCs, which were established under the Phoenix program, and was disseminated to ARVN, US, and other FWMAF tactical units from those centers.

4.1.5 <u>Special Intelligence Structures</u>

(S) A number of special structures were involved in the collection of intelligence of value to US commanders for planning and conducting operations. Some of these operated within the general frame of MACV J2 cognizance. Others operated apart from that frame. The Radio Research (SIGINT) activities of the Army Security Agency were organized in direct support of each echelon from COMUSMACV/MACV J2 down through divisions and separate brigades. Special ground reconnaissance operations in enemy base areas and cross-border sanctuaries, however, were carried out by MACSOG apart from the MACV and JGS J2 branches. The CIDG program which was advised by Army Special Forces and whose surveillance and reconnaissance activities provided an abundance of tactical intelligence was also outside the MACV J2 structure.

4.1.6 <u>USAF Out-of-Country Collection Programs</u>

(C) Out-of-country intelligence collection programs, primarily by the 432d Tactical Reconnaissance Wing (TRW) at UDORN RTAFB and Task Force Alpha at NKP RTAFB were organizationally under the Deputy Commader 7th/13th Air Force, headquartered at UDORN RTAFB (see Figure 4.3). However, mission operational control was vested in the Commander, 7th Air Force. Mission sortie allocation was determined by MACV for the 432d TRW, and COMUSMACV could also allocate Task Force Alpha (TFA) capabilities as to area of specific operations, e.g., Laos, South Vietnam, etc., as he saw fit. The decision not to implement the Laotian antipersonnel infiltration program in early 1968 and the plan to employ Igloo White resources during the defense of Khe Sanh exemplify MACV control over TFA operations.

(C) MACV, working with the 7th Air Force TACC, through the Joint Combat Operations Center, assured that priority MACV targeting and support were accomplished by mission category. The 432d TRW and TFA were viewed as resources to be "fragged" and/or employed by 7th Air Force through the 7th Air Force Deputy for Operations, TACC.

(C) The arrangement outlined above and shown in Figure 4.3 appeared an effective operational management system. However, it did cause some intra-service (USAF) problems with respect to the two out-of-country operations: viz., were they intelligence operations or combat elements under combat operations control?

4.2 ORGANIZATION AND MANAGEMENT PROBLEMS

(U) A number of intelligence organizational and management issues were never satisfactorily resolved during the period of US participation in combat operations. Unity and coordination of all intelligence agencies in a theater of operations are essential to produce optimum results. Achieving the required unity and coordination was especially difficult in the early campaigns when headquarters and units representing several allied nations were introduced. Some problems had to do with theater organization and inter-agency coordination; others concerned the differing doctrines of the Services for the control of functions and the allocation of resources, and still others revolved around personnel training and assignment practices. The following sections discuss some of the more important of these problems and issues.

4.2.1 The Theater Which Never Existed

(S) Southeast Asia was a theater of operations in every respect except for US and allied organization to prosecute the war. North Vietnamese forces and North Vietnamese-cadred indigenous troops controlled three-fifths of Laos and a substantial portion of eastern Cambodia in early 1965 when US ground combat forces were deployed to Vietnam.[15] Enemy operations in South Vietnam were mounted and supported from these out-of-country locations and yet, MACV's authority to seek out and attack the enemy was absolute only within the territorial limits of South Vietnam. The war against the enemy in his cross-border sanctuaries was prosecuted mainly from the air until the US and ARVN incursion into Cambodia in 1970 and the ARVN incursion into Laos in 1971. The air war was the responsibility of the Air Force and Navy, both of which responded as often to the intelligence requirements of Theater Headquarters in Hawaii and National Military Command authorities in Washington as to the requirements of MACV itself.[16] Of the many daily reconnaissance sorties flown over Vietnam and neighboring areas, MACV was more a subscriber to the program rather than the principal or executive agent.[17] Similarly with respect to collecting intelligence on the ground from within the enemy's bases and sanctuaries, MACV participated in but lacked full control over the setting of priorities. Owing in large part to US interagency disagreements and to the political climate in Washington it became necessary to vest control directly in the highest national authority.[18]

(S) Within Vietnam, numerous US and allied organizations engaged in intelligence activities. US elements included: MACV J-2; MACV CORDS; MACSOG; US Army, Navy, Air Force and Marine Corps intelligence components; NSA; and CIA. The armed forces of the Republic of Korea, Thailand and Australia also had organic intelligence units. COMUSMACV's relationships with these various commands and organizations ranged from complete control to cooperation and liaison only. Joint and combined intelligence planning, direction, cooperation and liaison nevertheless improved daily as the war progressed, experience was gained and lessons were learned.

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[15] Research Analysis Corporation, US Army Special Forces and Similar Internal Defense Advisory Operations in Mainland Southeast Asia, 1962-1967 (U), June 1969, p 214f, SECRET/NOFORN.

[16] McChristian, op. cit., p 98ff.

[17] Ibid.

[18] Interview data and Appendixes A and D.

(S) Vis-a-vis the GVN, MACV's authority was, however, circumscribed by the terms of multiple agreements concerning US military and civilian agency participation in intelligence collection, analysis, and dissemination. Vietnamese police and other civilian community-oriented special intelligence programs were US advised and assisted but the GVN military and police intelligence structures distrusted each other and often refused to cooperate.[19] The leverage of funding was the only real source of control.[20] Attempts to use it often met with stiff resistance and degraded Vietnamese cooperation at all echelons. When cooperation was only reluctantly given at province and district through the PIOCC/DIOCC system, tactical intelligence of value to US combat forces declined in quantity and quality.

4.2.2 Differing Service Doctrines

(U) US Army doctrine for combat operations holds that intelligence and operations planning are interdependent functions which must be integrated at all levels of tactical command.[21] Essentially this doctrinal concept means that from battalion through division, tactical intelligence must be integrated into the operations cycle on as near a real-time basis as can possibly be achieved. That this concept was implemented in Vietnam can hardly be disputed. The heart of battalion, brigade, and division operations was a Tactical Operations Center (TOC) which effectively combined the S-2/G-2 and S-3/G-3 staff functions. It follows from this basic Army doctrinal view that tactical intelligence needs are best and most timely served when tactical commanders control the resources which will satisfy their needs. The Army therefore consciously strives to decentralize control over collection means to give each tactical commander the capabilities required for effective performance of his mission.

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[19] Benedict, op. cit., p 97ff.

[20] Ibid.

[21] Cf. FM 30-5, Combat Intelligence.

(U) The US Air Force and Navy hold a different view of the intelligence process, and rightly so because of the different requirements and environmental circumstances which attend their missions. For them, centralization of control over the means of collection and the instruments of analysis more efficiently serve their tactical needs. No problems arise until the different systems must be joined in an operational environment such as Southeast Asia. For the most part, the experience shows that the systems were joined effectively. But there were exceptions.

(C) Army tactical command needs for aerial photography most often could not be discerned far enough in advance to accommodate the lead-time requirements of the US Air Force. Hence, Army tactical commanders often found the products of aerial photographic reconnaissance to be untimely by up to 7 days, especially during times of heavy cloud cover.[22] To satisfy their requirements on a more timely basis, Army commanders successfully experimented with hand-held cameras operated from their own helicopters and other light aviation assets. Air Force FACs had initiated this experiment in early 1965 and later extended it to interdiction campaign operations in Laos. Hand-held photography, though perhaps lacking the clarity and resolution obtainable from Air Force reconnaissance systems, had the decided advantage of availability in a matter of hours, while it was still relevant to a tactical situation.

(C) SLAR and IR tactical intelligence collection assets were less successfully decentralized to Army maneuver units. This was apart from the peculiar circumstance in I CTZ surrounding III MAF control of the Mohawk system (see Section 4.1.3). Field Force allocations of Mohawk sorties to divisions and separate brigades under a system which combined priorities and sortie availabilities helped but did not fully solve the problem of providing results to users in real-time. So long as it was necessary to process and analyze mission results at Field Force in the absence of ground data link terminals at requesting unit levels, there

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[22] Interview data. See also McChristian, op. cit., p 100.

was an inevitable delay (from 2½ to 6 hours) in transmitting the collected intelligence to the consumer. By this time the target had usually vanished.[23] Even with a real-time readout capability at user unit levels, there were time delays in reconciling sensor indications with maps at scales most useful for tactical command decision.[24]

4.2.3 Intelligence Planning

(C) Before combat troops are committed to an area of operations, a master plan should be developed, if possible, to forecast requirements for intelligence assets and to guide their development and expansion. US Army and Marine Corps combat units were deployed to Vietnam in the spring of 1965, but it was not until late summer that an integrated plan for intelligence support was approved. Adequate intelligence capabilities had not been maintained in a combat effective condition before 1965, and the immediate requirement was therefore to organize, train, and commit needed units as quickly as possible. Some changes and modifications in established TOE organizations were expected and accomplished as experience in-country was gained.

4.2.4 Intelligence and Security

(C) SIGINT was another area in which Army performance was less than satisfactory in the view of the majority of tactical commanders in Vietnam, although the evolutionary development of SIGINT organization and support to tactical commanders was perhaps the most significant aspect of the tactical intelligence experience. Army doctrine for the employment of SIGINT assets is consistent with general doctrine for combat intelligence, i.e., that ASA support will be provided under G-2 staff control.[25]

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[23] US Army, Adjutant General, "Senior Officer Debriefing Report: BG L. D. Kinnard, CG II Field Force Vietnam Artillery, Period 21 May 1969 to 20 November 1969 (U)," AGDA(M) (9 Jan 70) FOR OT UT 69B056, 20 Jan 1970, p 20, CONFIDENTIAL.

[24] Ibid. See also Benedict, op. cit., p 141.

[25] Cf. FM 39-5, pp 2-18 and 2-21 (UNCLASSIFIED) as well as FMs 30-18, 32-20, and 30-31A, SECRET.

The support was provided — more than 20 radio research companies and detachments were eventually assigned in direct support to Army tactical units. In addition, the 224th Aviation Bn (RR) and fixed facilities such as the 8th RR Field Station at Phu Bai helped provide general support country-wide.[26] The ASA direct support elements were commanded through the 303d RR Bn at Long Binh and the 313th RR Bn at Nha Trang. Both belonged to the 509th RR Group (see Fig. 4.1).

(C) The real problem attending ASA support was not so much the lack of units and equipment as the security controls surrounding the releasability of collected signal intelligence to tactical commanders in need. In the beginning, security regulations were interpreted so rigorously by many direct support unit personnel, and senior commanders with proper security clearances were obliged to observe the regulations so scrupulously, that battalion commanders were routinely denied access to timely readouts of intercepts.[27] A continuous and positive effort to provide the best possible timely support within the security requirements established by national authorities resulted in more personnel per division and separate brigade being authorized clearances. Additionally, the increased flow and availability of collateral information facilitated the sanitization of more SIGINT and its wider dissemination to tactical units.[28]

(C) A majority of tactical commanders interviewed subscribe to the view that SIGINT is such an essential source of information that infantry battalion commanders and air cavalry quadron commanders must be

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[26]OCMH, op. cit., p 109. See also CINCPAC, "Strength Reports – Vietnam (U)," CONFIDENTIAL.

[27]See Appendix A.

[28]Interview data.

afforded access to it as well as to all other available information regarding the enemy situation. Senior commanders who were routinely tasked to provide lift and gunship support to MACSOG operations, but who were denied the benefits of the intelligence gained from them, include that category of intelligence in their recommendation.[29]

4.2.5 Personnel Resources

(C) Military intelligence traditionally has not been renowned as a career specialty leading to early professional recognition and rapid promotion. Indeed the US Army's present Military Intelligence Branch dates only from July 1962 and had been in existence for only 3 years when Army combat units were committed to Vietnam. At that time, MACV had only an austere capability to produce the military intelligence required for combat operations. The greater part of the available capability, moreover, was committed to advisory support of the RVNAF.[30] An inventory of Army personnel quickly revealed only a modest number of specialists in the various disciplines of intelligence activities, with few officers being fully qualified to perform G-2/S-2 combat intelligence duties. The US Army Intelligence School (USAINTS) increased the output of enlisted and officer specialists but was unable to respond directly to the special requirements of Vietnam in the context of joint and combined operations until lessons-learned and experience reports were received from the field.[31] The USAINTS curricula therefore remained primarily oriented toward support of the CONUS counter-intelligence mission and USAREUR collection needs.[32] The Continental Army Command Intelligence Center (CONTIC) at Ft. Bragg,

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[29] Interview data. See also, US Army Adjutant General, "Senior Officer Debriefing Report, MG John R. Hennessey, CG, 101st Airborne Division, Period May 1970 through January 1971 (U)," AGDA-A(M) (18 March 71) FOR OT UT, 71B017, 21 March 1971, p 4, CONFIDENTIAL. See also Benedict, op. cit., p 41.

[30] Benedict, op. cit., pp 13, 17, 19ff.

[31] OCMH, op. cit., p 122. Benedict, op. cit., discusses this problem at length in Ch. III of his study. He furthermore relates one facet of it to the SIGINT problem; i.e., none of the US personnel working in the CICV out-country OB section possessed SI clearance.

[32] Ibid, p 28f.

where MI units were activated for deployment to Southeast Asia, arranged for supplementary area orientation and field exercises with Special Forces for the graduates of the USAINTS. This additonal training helped but MACV J2 nonetheless continued to find new arrivals to be undertrained and woefully lacking experience.[33] Not until February 1968 did USAINTS inaugurate a special, abbreviated Southeast Asia course and not until September 1970 was a DIOCC/PIOCC MI advisor course organized at Ft. Bragg.

(C) The impact of these initial shortcomings on tactical intelligence operations in Vietnam was felt at every level of command. The results of the questionnaire survey and interviews conducted in support of this study verify this finding with particular reference to the earlier campaigns of the war. The results also show an overwhelming concensus among former battalion, brigade, and division commanders, and among senior, division intelligence officers that a solid requirement exists for professionally trained intelligence personnel at all levels of tactical operations.[34] Meeting this requirement could require a restructuring of the current readiness base.

4.3 UNRESOLVED ISSUES

(U) Despite the successes achieved in solving most major problems encountered in organizing and managing the tactical intelligence effort, a number of issues continued to prove troublesome insofar as many tactical commanders were not completely satisfied that better solutions could not be found. Among these continuing issues were:

- The proper echelon of control for different collection and analysis assets,
- The best way to integrate the intelligence and operations planning functions,
- How best to introduce new collection systems to combat-engaged forces.

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[33] Ibid., p 44ff.

[34] See below under Echelon of Control, and Table 4.2.

4.3.1 Echelon of Control

(U) Among the tests for effectiveness of different intelligence collection means and systems is whether their outputs are received early enough for tactical commanders to take timely and effective action against enemy targets which the systems succeed in identifying. Each collection means, whether HUMINT, SENSOR or SIGINT, has distinctive characteristics conditioning its ability to identify targets in relation to time. In general, every system goes through a cycle of data acquisition, registration, reporting and interpretation before any action is taken. Some systems, including the human mind, can acquire, register and report data in near instantaneous fashion. Others, such as photography must be manipulated in various ways for the data to be acquired, registered, reported, made available for interpretation/analyses and, ultimately, command action.

(U) Time delays tend to be most closely associated with the reporting and interpretative functions. Because data processing often requires the use of relatively elaborate and expensive equipment, it is often more cost-effective and no more time-consuming to accomplish it at central locations than to provide each tactical echelon with the necessary means. Similarly, interpretation and analysis can be very time-consuming depending on the type of collection means involved and on the availability and proficiency of skilled intelligence analysts. Photo interpretation, for example, is a skill whose mastering requires much dedicated effort. Qualified photo interpreters tend always to be in short supply and it therefore often becomes necessary to concentrate them where their skills can be optimized by strict orders of priority. In Southeast Asia this was theater Air Force, two levels above the principal consuming or tactical response level which was division.

(U) As a practical matter, the interpretation and analysis of collected intelligence can be performed wherever adequate facilities, equipment and skilled personnel are located. The analytical function, in short, is independent of the collection and reporting functions and may be divorced both from it and from questions of control over collection assets. Any echelon can interpret and analyze collected data. For the

Table 4.1 (C)

COLLECTION MANAGEMENT IN RELATION TO
TIMELINESS AND UTILIZATION OF DATA (U)

Collection means			Control echelon	Principal users	Timeliness to users	Primary utilization of data
HUMINT	GROUND PATROLS	MACSOG	MACV	MACV	2	P
		LRRP (US)	Div	Div	1	T
		UNITS IN CONTACT	Bn	Bn	1	T
		OTHER FRIENDLY	Bn	Bn	2	P
	AIRBORNE OBSERVATION	AIR CAVALRY	Div	Div	1	T
		FAC	Div	Div	1	T
		OTHER VISUAL	Bde/Bn	Bn	1	T
	INTERROG.	PRISONER (IPW)	Div/Corps	Div	2	P
		RALLIER (CHIEU HOI)	Div/Corps	Div	2	P
	AGENTS	UNILATERAL (US)	MACV	Corps	2	P
		GVN (PIOCC/DIOCC)	Corps	Div	2	P
SIGINT	SIGINT	COMINT	Corps	Div	3	P
		D/F	Corps	Div	2	T
		ELINT	7th AF	Sqdn	1	T
SENSOR	GROUND	UNATTENDED (UGS)	Div	Bn	1	T
		SURV. RADARS	Div/Bde/Bn	Bn	1	T
		IGLOO WHITE	7th AF	Sqdn	1	T
	IMAGE INT.	LLTV	7th AF *	Sqdn	1	T
		NOD (ACTIVE/PASSIVE)	Bn	Bn	1	T
	AIRBORNE	SLAR	Corps	Div	3	P
		IR	7th AF	Div	3	P
		BLACK/WHITE PHOTO	7th AF	Div	3	P
		SNIFFER (APDS)	Div	Div	1	T
		FLIR	7th AF *	Sqdn	1	T

Key: T = Targeting, P = Planning and Assessment
1 = Always, 2 = Usually, 3 = Seldom
*System used in RECCE-STRIKE mode.

effort to be worthwhile, however, the analyzed data must be made available to echelons capable and authorized to take effective action, and within time limits which will permit the action to be taken. Herein lies the essence of the problem of collection management.

(U) Table 4.1 shows how collection means were managed in Southeast Asia with regard to:

- control echelon
- principal consumer
- timeliness to users
- primary utilization of collected and analyzed data.

(C) In Southeast Asia, some senior ground commanders were less than satisfied that perishable intelligence, which they believed could have been effectively interpreted and analyzed at division level, reached their commands as fast as it would have if the collection assets had been controlled by them. This was certainly true of SIGINT data in the early period of operations, and was true of SOG-acquired data throughout the entire war. It was also true, in part, for MOHAWK-acquired data where the requesting ground echelon lacked terminal facilities for instantaneous readout of data acquired by aircraft in-flight. When ground terminal facilities were unavailable, the collecting aircraft had to return to base before the data could be extracted for analysis, following which the results had to be physically transmitted to the division which had requested the coverage. The delays associated with this process were such that results seldom reached division level in time for effective action to be taken. Ground commanders familiar with USAF "closed-loop" reconnaissance strike procedures, in effect sought something similar, i.e., the colocation of reconnaissance and strike capabilities. Insofar as the bulk of the ground strike assets are normally located at division, the solution sought would concentrate collection and analysis assets at that echelon.

(U) A number of important factors inhibited the proposed solution in Southeast Asia and will probably continue to work against it in the future in other theaters. Included among these factors are:

- security requirements
- data processing equipment needs and costs
- number and cost of available collection systems
- location of strike authority.

(C) Table 4.1 shows that for 24 collection means more than half were normally controlled at levels above division even though division and lower echelons were the principal users of the data in all but two instances. The two exceptions were MACSOG patrols and agents unilaterally maintained by the US. Both reported on enemy activities in remote war zones, border areas and cross-border sanctuaries. The others which were controlled above division but whose outputs were used principally at division and lower levels were of two major types — SIGINT and airborne sensors. Table 4.1 shows that SIGINT data varied in timeliness to their users; the reasons had mainly to do with security as previously discussed. SLAR, IR, and photography among airborne sensor data were seldom useful to tactical commanders, however, even for generalized planning purposes, primarily because they depended on favorable weather conditions, required lead-time to set-up, and also required processing time upon completion of missions. There was also, of course, an absence of moving vehicles in South Vietnam for Mohawk to acquire for targeting purposes. The scarcity and costliness of the airborne collection system moreover, required that its use be fully optimized and this necessitated control at echelons above division. Even if sufficient systems had been available to provide each division with its own complement it is difficult to see how control at that level would in any way have solved problems of weather or shortened processing and analytical times. None of this is to suggest however that in a different theater with more open terrain and an abundance of armored and other vehicular targets presented by the enemy, it would not be better for the Mohawk system to be controlled at division and separate brigade levels.

(U) Apart from the SIGINT and airborne sensor cases, Table 4.1 shows that HUMINT data were usually if not always received on a timely basis down to battalion level even when collection and analysis were performed by division or corps. The outputs of other sensor systems were also received quickly enough at lower tactical echelons to serve the primary purpose of targeting.

4.3.2 Collection Priorities and Resource Application

(U) The majority of collection assets in Southeast Asia were capable of serving both immediate tactical target development and long-term planning and assessment needs. Operational requirements demanded that the intelligence effort be oriented primarily toward the development of targeting for immediate combat response. The consumers were, therefore, first and foremost the tactical maneuver elements rather than the planning and management staffs of higher, theater-level and national headquarters. Simultaneously, however, MACV, Hawaii and Washington had needs for data similar to that required for targeting but for purposes of long-term planning [including support to the RVNAF and other Free World Military Assistance Forces (FWMAF)] and for assessing progress for the benefit of senior national leaders. There is no evidence that higher headquarters in any way opposed the target orientation of the intelligence effort; but their requirements for in-depth reporting of intelligence to support their planning and assessment functions sometimes differed from the requirements for target development and gave rise to conflicting demands for the application of scarce collection resources. The urgency with which higher headquarters sought fulfillment of their needs also tended to reorient the thrust of the reporting effort in an upward direction and away from the target-seeking tactical maneuver elements. Simply assuring that all target-relevant data would be reported to all interested tactical echelons at the time of first reporting, regardless of whether the data were acquired in response to a specific information request from a higher headquarters, and regardless also of the means of collection, would have solved the problem. But security controls and command arrangements worked against such a straightforward solution. The SIGINT problem was solved in time, but MACSOG data were never directly furnished to tactical echelons even when immediately relevant to their situation.

4.3.3 Integration of Intelligence and Operations

(U) In Southeast Asia the pace of the war and the tactics of the enemy impelled a great compression in intelligence cycle time as compared to Korean War and World War II experience. Technology made it possible to acquire and analyze tactical intelligence in "real time," i.e., at or nearly at the moment of event occurrence. Tactical unit commanders and operations planners needed all target data as fast as it could be acquired, processed, and made available. The organizational response to promote the timely passing of analyzed intelligence from the intelligence channel to the operations channel was to integrate the functions in the Tactical Operations Center (TOC) at each tactical echelon. The practice became standard in Vietnam and will probably continue to be observed as an efficient way to reduce intelligence cycle time.

(U) It is abundantly clear from the experience of the October 1973 War in the Middle East, however, as well as from the Southeast Asia experience, that the ever-increasing range and lethality of modern weapons will continue to require further compression of cycle times required in tactical intelligence acquisition and evaluation, and in operations planning. Senior tactical commanders and intelligence officers surveyed in this study share this view in overwhelming proportion. Table 4.2 shows 94% affirmative agreement with the proposition that it is imperative to achieve further reductions in intelligence cycle time. How to achieve the reduction is, however, an unresolved problem. Opinions sampled in this study show an even split on whether more automation can help (Table 4.2). If automation is to succeed, then ways must be found to ensure that automated data bases will contain and will yield on demand the information directly relevant to immediate tactical situations. Improved procedures are a more likely means of reducing cycle time in the view of individuals surveyed in this study. This implies at a minimum a further streamlining of tactical intelligence reporting, production and dissemination procedures to reduce if not eliminate time-consuming steps without sacrificing essential security controls.

Table 4.2 (U)

SURVEY RESULTS
ORGANIZATION AND MANAGEMENT ISSUES

	% Yes	% No
Language		
Language a major problem?	37	63
Personnel & Training		
Need more Intelligence personnel?	13	87
Same number but improved training?	82	18
Need more professionally trained personnel?	90	10
Need better training in analysis?	92	8
Intelligence Cycle Time		
Imperative cycle time be reduced?	94	6
More automation needed?	50	50
Improved organizational procedures?	91	9
Security		
Need less stringent security control for all source intelligence?	92	8

4.3.4 Introducing New Systems During Combat

(U) Unattended ground sensors, electrooptical night observation aids, advanced radars and "sniffers" were among the new equipment items introduced to US forces in Southeast Asia while the war was in progress. Successes varied as discussed elsewhere in this report.[35] An organizational factor bearing directly on the successful introduction of the new collection means and systems was whether provisions were made (a) to train unit personnel in the use and maintenance of the new equipment, and (b) to insure the availability of spares and parts in normal supply channels. The experience with unattended ground sensors was the most extensive and illustrative of the problem. It confirmed that new collection means and systems will be successfully introduced and employed at tactical unit level only when provision is made to trains using unit personnel in their operations and maintenance. Such training was more the exception than the rule for ground force units which were provided UGS through the "Duffle Bag" program.[36] As a result, many ground forces commanders gained erroneous impressions of the capabilities and limitations of UGS.

4.4 ASSESSMENT

(U) The organizational and management problems, and the issues surrounding US tactical intelligence operations in Southeast Asia were serious indeed. Some which impacted heavily on the collection, processing, analysis and dissemination of tactical intelligence could easily arise in a future conflict when less time would be ilable to seek solutions. Included in this category are:

- Meeting immediate needs for trained and qualified intelligence specialists.
- Assembling and disseminating basic intelligence adequate to the operations planning needs of tactical echelons as they arrive in-theater.

[35] Cf, Chapter 3 and Appendix D.

[36] Cf, Appendix D.

- Coordinating the US tactical intelligence effort with allied forces and governments.
- Allocating scarce and costly collection, reporting and analysis assets among tactical echelons.
- Integrating intelligence and operations to permit immediate operational responses to priority targets as acquired through intelligence systems.
- Preserving essential security while effecting maximum dissemination of intelligence to all tactical echelons on as near a real-time basis as possible.

(U) The most striking feature of the US organizational and management experience is the amount of time taken after mid-1965 to develop the full range of joint and combined intelligence capabilities required to carry on the war. The principal cause of the time consumption was the lack of a reservoir of trained intelligence personnel for immediate augmentation of MACV and tactical units and for expanded advisory and assistance support to the RVNAF. Insofar as future contingencies are likely to prove much less permissive in respect of time to develop and field tactical intelligence assets in support of deployed combat formations, it is essential that the Services devise improved mechanisms for maintaining in their active inventories the types of skills which will be required.

(U) Another very important feature pointed up by the Southeast Asia experience is the need for modern tactical intelligence systems to serve multiple users and multiple echelons simultaneously and in near-instantaneous fashion. The operations pace was both rapid and constant night and day; areas of responsibility were larger at every echelon of command; and targets had to be evaluated, acquired, and destroyed when first detected, else they would disappear. It was imperative therefore that intelligence should flow to tactical operations centers and to higher echelon staff planners simultaneously, regardless of the echelon at which it was acquired and regardless also of the nominal point of control over the collection means.

5 IMPLICATIONS OF THE SOUTHEAST ASIA EXPERIENCE FOR TACTICAL OPERATIONS IN OTHER OVERSEAS AREAS (U)

(U) The conflict in Southeast Asia was unique to the experience of US forces in many ways. Chief among them were the absence of clearly defined battle lines, the availability of privileged sanctuaries to the enemy at different times and places during the years of US involvement, and the enemy tactic of seeking domination of people rather than terrain as the means to his end. The combination of terrain, vegetation, out-of-country sanctuaries, and the overall pattern of population settlement favored enemy military operations and seriously limited the range of ARVN, US, and other FWMAF initiatives. The experience was also made unique by the US role as an ally rendering advice and assistance to the governments and armed forces of South Vietnam, Laos, Cambodia, and Thailand. In virtue of this role, which differed significantly from country to country, US military operations were subject to a variety of political constraints imposed by the assisted powers.

(U) While it is open to question whether such conditions would be repeated elsewhere in the world where US forces might be required to operate in the future, it is important that planning for future contingencies take into account the implications of US tactical intelligence experience in Southeast Asia.

(U) For example, an outbreak of war in Europe, under conditions where each side would seek to confine the geographical limits of the fighting and its intensity below the nuclear threshold, as well as a war in the Middle East, which might require the employment of US forces to safeguard US interests, could entail a set of politico-military constraints similar to that of Southeast Asia. Southeast Asian operations, moreover, offered the opportunity to introduce, employ, and evaluate new intelligence collection systems under combat conditions. This experience, and the requirement to organize and manage a major tactical intelligence effort in an overseas theater over an extended period of time (1965-73), provided lessons which should be evaluated for application in future conflict situations.

(U) The purpose of this chapter, therefore, is to examine, in exploratory fashion, how US tactical intelligence experience in Southeast Asia may contribute to contingency planning for two other overseas areas of vital strategic interest to the US: the Central Region of Europe and the Middle East. Obviously, the applicability of US tactical intelligence lessons in Southeast Asia in this context can be thoroughly tested only through detailed analysis of specific conflict scenarios tied to particular combat situations, terrain, and environment. Nevertheless, an examination even in broad terms of the key similarities and differences in the likely conflict environment in the European Central Region and the Middle East as compared to Southeast Asia, and the similarities and differences in expected tactical intelligence needs in each case, can provide a basis for tentative conclusions on the utility of the collection means employed in Southeast Asia and about the applicability of other lessons from US tactical intelligence experience in Southeast Asia to these conflict contingencies.

5.1 THE CONFLICT ENVIRONMENT IN CENTRAL EUROPE AND THE MIDDLE EAST COMPARED TO SOUTHEAST ASIA

5.1.1 Southeast Asia

(U) Southeast Asia represented a low- to mid-intensity war in comparison to the likeliest scenarios for Europe and the Middle East. Specific operations analyzed in this study were of three principal types — main force, pacification (area security and control), and air interdiction.

5.1.2 Europe Central Region

(S) The conflict contingency of perhaps greatest concern in the Central Region of Europe is an outbreak of war in the form of a series of swift, deep-penetration thrusts by Warsaw Pact (WP) armored and mechanized forces against defending NATO elements for purposes of overrunning NATO's forward defenses and destroying NATO reserves.

Such an attack could be initiated with little warning if a decision were made to attack prior to completion of mobilization and buildup, and to exploit advantages of great numerical superiority at selected points of attack.

(S) In contrast to Communist tactics in Southeast Asia, a WP attack in the Central Region would be direct and massive and Allied defense would be characterized by highly mobile operations to achieve maximum attrition of enemy armor and to make maximum use of obstacles to contain and channelize the enemy in prelude to Allied counter-attacks. However, a noteworthy similarity to Southeast Asia might occur insofar as Allied forces at the outset would be unauthorized to cross political borders between NATO and WP territory either to collect tactical intelligence or to conduct tactical ground or air operations against enemy forces. Interdiction operations would therefore be initially confined to the NATO side of the line.

5.1.3 The Middle East

(U) The Middle East, embracing a part of North Africa and Southwest Asia, is a broad expanse of terrain whose dominant features are arid, open deserts and unforested mountains, and semi-arid open plateaus. The strategic importance of the Middle East derives from two factors: It sits athwart the land, sea, and air routes between Europe and East Asia, and it contains the greater part of the world's proven oil reserves. Sustained interruption of the flow of Middle East oil to Western Europe, Japan, and North America could result in the economic strangulation of the industrialized West.

(S) A major deployment of US armed forces to the Middle East might be occasioned by: (1) a direct Soviet attempt to seize the region's oil fields and refineries; (2) Soviet military intervention in an otherwise localized Arab-Israeli conflict; (3) a Soviet-supported subversive insurgency in the Persian (Arabian) Gulf region attaining such proportions that only the intervention of US forces would prevent the oil reserves from coming under control of a regime hostile to the West, or (4) an indirect Soviet challenge through a client state (e.g., Iraq, Syria) to control the region's oil reserves. An effective US response to any of these contingencies would require direct application of US land, sea, and air power against forces which would be armed and equipped in major part with materiel of Russian or other Communist country design and manufacture.

5.1.4 Operational Environmental Factors

(C) Table 5.1 compares Southeast Asia, the Middle East, and Central Europe in terms of:

- types and intensities of military operations
- key operational and environmental factors significantly influencing the timely collection of tactical intelligence through either human or mechanical means.

The comparisons show that, in sharp contrast to the diversity of Southeast Asia, the influences of cover, terrain masking, population, enemy air defenses, weather, and enemy ECM would be more nearly uniform for different types of operations in Europe and in the Middle East. This uniformity, however, would not necessarily work to the advantage of US forces.

(U) Terrain masking in Southeast Asia, for example, was light to moderate in main force operations, light in pacification operations, and moderate to heavy in interdiction operations. It would be heavy for most types of operations in Central Europe with consequent impacts on collection systems requiring line-of-sight conditions.

(S) Enemy Air Defenses and ECM are two especially important environmental factors whose impacts in Europe and the Middle East would be much greater than in Southeast Asia. There is no doubt that the density of enemy air defenses in Europe together with the likely use of ECM against electronic collection systems would inhibit manned aircraft collection platform performance. In the Middle East, performance would also probably be degraded below Southeast Asia levels in all types of operations except for "pacification" in guerrilla-infested areas. ECM might be encountered in both areas to a sufficient degree to seriously degrade indirect fire control, tactical air control, and air and ground data links.

Table 5.1 (C)

OPERATIONAL ENVIRONMENT FACTORS: SOUTHEAST ASIA
EUROPE, AND MIDDLE EAST (C)

Area and type operation	Tactical targets environments					
	Cover	Terrain masking	Population influences	Air defense	Favorable Weather (%)	ECM
Southeast Asia (Low-mid intensity)						
1. Main Force	Heavy	Light-moderate	Light	Light	50	Light
2. Pacification	Moderate	Light	Heavy	Light	50	Light
3. Interdiction	Moderate-Heavy	Moderate-Heavy	Light	Moderate-Heavy	50	Light
Europe Central Region (Mid-high intensity) (NATO vs Warsaw Pact)						
1. Delay/defend Main Force	Moderate	Heavy	Moderate-Heavy	Heavy	33	Heavy
2. Counterattack Main Force	Moderate	Heavy	Moderate-Heavy	Heavy	33	Heavy
3. Interdiction	Moderate	Heavy	Moderate-Heavy	Heavy	33	Heavy
Middle East (Low-mid intensity)						
1. Soviet Main Forces	Light	Light-moderate	Light	Heavy	90	Moderate
2. Middle East Main Forces	Light	Light-moderate	Light	Heavy	90	Moderate
3. Middle East Guerrilla Pacification	Light	Light-moderate	Light	Moderate-heavy	90	Light
4. Interdiction	Light	Light-moderate	Light	Heavy	90	Heavy

(U) The cover of jungle vegetation seriously interfered with visual observation and degraded the effective operations of a variety of sophisticated airborne intelligence collection systems in Southeast Asia. Vegetation cover would pose less of a problem in Central Europe and virtually no problem in the greater part of the Middle East. Weather, however, might prove more unfavorable in Central Europe than in Southeast Asia (i.e., cloud cover, fog, haze, etc, affecting photographic and electro-optical devices) but would be far more favorable in the Middle East.

(U) Population influences would be substantially different in Central Europe from what they were in Southeast Asia. The higher and more uniform density of population in Europe and its definite pro-Western and anti-Soviet orientation would provide greater HUMINT potential. On the other hand, discriminating military personnel and targets from innocent civilians in highly fluid tactical situations would present difficulties in Europe. The much less dense pattern of settlement in the Middle East, however, would pose fewer problems of this sort.

5.1.5 Target Densities

(S) Table 5.2 illustrates how "target poor" Southeast Asia was in comparison to the target potential likely to exist in Central Europe and the Middle East. In operations against enemy forces in War Zone C, the US 25th Division normally operated along an approximately 50km-wide front. This is the same frontal area of responsibility of US divisions in Germany, and is also the approximate length of the line of demarcation between Israeli and Syrian forces in the Golan Heights before the outbreak of fighting on 6 October 1973. At that time, the Golan front was held by a light, division-equivalent (three brigades) Israeli force. A comparison of the number and kinds of targets presented by opposing ground forces in War Zone C, Central Europe, and the Golan Heights is therefore instructive of the essential differences in target densities between the three areas.

(S) During the height of US involvement in combat in War Zone C, enemy strength ranged from 10,000 to 14,000 men in main and local force units. The enemy had no tanks nor other armored vehicles,

Table 5.2 (S)

REPRESENTATIVE TARGET DENSITIES PER 50 KM FRONT (U)

Opposing Ground Force \ Region	War Zone C	Central Europe	Golan Heights
Strength	10,000 - 14,000	> 50,000	> 50,000
Composition	Regional Command ● 1 Inf Div ● 2 Inf Regts (Sep) ● 1 Arty Regt (Sep) ● Supporting Local Forces	Combined Arms Army ● 3 MRD ● 2 TKD ● Supporting Elements	Syrian Army Attack ● 2 Armor Div ● 3 Inf Div ● 2 Armor Bdes (Sep) ● Supporting Elements
Tanks	None	1300	1000
Other Armored Vehicles	None	1900	300-400
Trucks	Negligible	6500	NA
Artillery	*Mortars & Rockets Only*	122 Batteries Field Arty	95 Batteries Field Arty

SOURCES: DIA, DI Intelligence Study, "A Summary of Lessons Learned in the Arab-Israeli War of October 1973"(U), Aug 1974, SECRET/NORFORN; DIA, USDAO Tel Aviv, IR 6849-0082- 74 SECRET/NOFORN; IR 6849-0094-74, SECRET/NOFORN; GRC,"Indirect-Fire Weapons Location, Vol I, Operational Requirements and Constraints,"CR-I-481, Oct 1973, SECRET; GRC, Project TENET II, "An Assessment of the 1973 War on Soviet Doctrine, Tactics and Materiel, Vol II - Main Report," OAD-CR-117, July 1975, SECRET. WSEG, "The October 1973 Middle East War," Vol VII, WSEG-237, Oct 1974, SECRET/NOFORN EXCEPT ISRAEL.

KEY: MRD - Motorized Rifle Division; TKD - Tank Division; NA - Not Available possessed only a few trucks of ancient vintage and had no artillery capability beyond mortars and rockets. In the Central Region of Europe, however, along an equivalent divisional frontage, Warsaw Pact forces would likely hold numerical and equipment advantages of between 3 to 1 and 5 to 1 in areas of concentration for attack. Table 5.2 illustrates the situation for an attack by a Soviet Combined Arms Army along a portion of front held by a US division. The expectation is that the attackers would be three to five times as strong as enemy forces in War Zone C and would be concentrated within a sector measuring 7-8 km in width and 10 km in depth. More than 3000 armored vehicles and 6500 trucks (in all, nearly 10,000 vehicles) would be located within the 70-80 sq km area. In addition, the Soviet attack force would be supported by more than 120 batteries of field artillery including self-propelled pieces. The density of targets available for acquisition would therefore be vastly greater than was the case in Southeast Asia.

(S) Similarly in the Middle East, forces organized, equipped, and trained according to Soviet doctrine would present an array of tactical targets nearly as dense as in Central Europe. The experience of Israeli forces in 1973 on the Golan Heights illustrates a typical situation (Table 5.2). The Syrian attack force was organized along the lines of a Soviet Combined Arms Army, although with fewer tanks and other supporting vehicles. The tactics employed in the principal assault on Israeli positions were consistent with Soviet doctrine insofar as the bulk of the forces shown in Table 5.2 were concentrated along a 7-8 km breakthrough zone to a depth of 10-15 km. In comparison to Southeast Asia, a concentration of this sort within a relatively narrow frontage and shallow depth would represent a "target rich" environment to opposing US forces.

(C) This greater density of targets will pose problems of efficient and timely processing of large volumes of data to ensure that targets are nominated for destruction in order of priority consistent with tactical needs and the availabilities of appropriate weapons.

(U) In Southeast Asia, the nature of the war was such that within hundreds of square kilometers of territory any moving vehicle belonged to the enemy, and, because he had relatively few vehicles, all that were detected were targets. In many parts of the Middle East and in all of Central Europe, however, the situation will differ markedly and there will frequently be a need to classify vehicle targets and to distinguish military from civilian traffic.

5.2 TACTICAL INTELLIGENCE NEEDS

(C) The basic combat intelligence needs in US operations in Central Europe and the Middle East against the types of forces depicted in Table 5.2 would be similar to those in Southeast Asia, particularly those generated in main force and interdiction operations. It can be expected that a key requirement would continue to be the location of enemy combat maneuver units in near real-time. In Southeast Asia the enemy most often led with infantry, and it was his main unit infantry formations that were the first-priority targets for tactical intelligence collection. In the Middle East and in Central Europe, armored formations will be the principal threat. Data on enemy strength, direction and rates of movement, the location of forward operating and supply bases, and other force-oriented subject matter, however, will also require priority attention in operations in Central Europe and the Middle East. These needs would be predicated on the requirement to find, fix, and destroy tactical C^3 capabilities, and forward support bases, along with the combat maneuver units. The relative priority of information on enemy command and control systems, enemy unit composition and offensive and defensive combat capabilities (including direct fire weapons), LOC alignments and vulnerabilities, and other standard intelligence needs will increase in importance as compared to the lower ranking accorded these intelligence needs by Southeast Asian tactical commanders. The requirement in Central Europe and the Middle East, in short, will very likely be for more information, in greater detail, and more rapidly across the whole tactical intelligence spectrum.

(S) Finally, there will be the requirement in Central Europe and the Middle East, as there was in Southeast Asia, for bomb damage assessment (BDA) associated with close air support and tactical air interdiction of targets in the enemy's rear. In Southeast Asia, post-strike BDA had to be performed in enemy base areas within South Vietnam and in out-of-country locations associated with his combat support systems. The various constraints which governed the employment of US combat power against targets in enemy rear areas could be repeated in Europe and the Middle East in a future conflict, thereby intensifying the difficulty of collecting accurate intelligence on rear area targets and on the effects of air strikes against them.

(S) Moreover, because war in Central Europe and in the Middle East would most likely be fought not only at higher intensities, but also over wider areas and against a more highly mobile enemy, the pressures for reducing intelligence cycle time will be even greater than those experienced in Southeast Asia. The needs of friendly ground and air commanders can be expected to approach immediacy at every level of command from company to corps and for all types of targets. Prevailing NATO estimates, for example, indicate that the frequency of required updates will range from 10 minutes at company level to 15 minutes at battalion, 30 minutes at brigade and/or division, and 60 minutes at corps. These needs would, moreover, have to be met for tactical areas of operational interest (TAOI) whose perimeters will substantially exceed those of Southeast Asia.

(C) Table 5.3 offers an illustration of the similarities and differences likely to apply with respect to basic intelligence requirements in Central Europe as opposed to requirements for Southeast Asia. Target category data are listed for each theater in the same order, i.e., troops, indirect fire weapons, vehicles (tracked and wheeled), C^3 facilities, supply storages, and bomb (or battle) damage assessment.

Table 5.3 (S)

TACTICAL INTELLIGENCE RANGE, ACCURACY AND FREQUENCY REQUIREMENTS:
SOUTHEAST ASIA AND CENTRAL EUROPE BY COMMAND ECHELON (U)

Area and Target Categories	Range (km)				Location Accuracy (m)				Update Frequency (min)			
	Bn	Bde	Div	Corps	Bn	Bde	Div	Corps	Bn	Bde	Div	Corps
Southeast Asia (low-Mid Intensity)												
Troops	15	30-50	75-100	150								
Indirect fire weapons	15	30-50	75-100	150								
Vehicles	15	30-50	75-100	150					Spot-240	360	720	1440
C3	15	30-50	75-100	150	50	50-100	100-200	200				
Supply storages	15	30-60	75-100	100-300								
BDA	15	30-60	75-100	100-300					Spot-240	—	—	720-1080
Europe (Mid-High Intensity)												
Troops	15	75	150	350	50	50	100-200	200	15	30	30-60	60-120
Indirect fire weapons	15	75	150	350	50	50	50-100	500	15	30	30-60	60-120
Vehicles	15	75	150	350	50	50	100-200	200	15	30	30-60	60-120
C3	15	75	150	100-350	50	50	50-100	500	15	30	30-60	60-120
Supply storages	NA	NA	NA	100-350	50	50	100-200	500	15	30	30-60	60-120
BDA	—	—	—	100-350	—	—	—	—	—	—	—	60-120

Sources:

Southeast Asia: US Unit After Action Reports, Operational Reports-Lessons Learned (ORLL) and Senior Officer Debriefing Reports (U), 1967-1973 (CONFIDENTIAL).

Central Europe: Project Avid Guardian Special Study Group Final Report (U), 5 July 1974 (SECRET); Long-Term Scientific Study on Reconnaissance, Detection and their Integration with Command and Control (U), NATO Document AC/243 (LTSS) D/16, July 1973 (NATO SECRET).

This is not necessarily the order of priority for any of the items. For Southeast Asia the data reflect average experiences as documented in Unit After Action and Quarterly Operational Reports — Lessons Learned (ORLL), and in Senior Officer Debriefing Reports. The European data are currently accepted US, UK, and FRG planning factors as derived from NATO-approved estimates.

(S) Table 5.3 also points up how in a war in Central Europe, US ground forces at brigade through corps levels would require timely intelligence to approximately the same degree of accuracy but at much more frequent intervals than was the average case in Vietnam. This situation should be expected to obtain regardless of whether tactical nuclear weapons were employed. Of particular significance is the anticipated need for further compression of intelligence cycle time in Central Europe as compared to the Southeast Asia experience. The needs for collection at greater ranges and for more frequent updates at all levels in Europe reflect the high mobility capabilities of Warsaw Pact forces who will be able to cover more ground more swiftly than enemy forces in Southeast Asia. This requirement would also apply in the Middle East against either Soviet or Soviet trained forces.

5.3 MEANS OF COLLECTION AND NEEDS SATISFACTION

(C) The above suggests that, although priorities of tactical intelligence needs would differ to some degree in a future conflict in Europe or in the Middle East, the essential requirements would continue to focus on troops, indirect fire weapons, tracked and wheeled vehicles, command, control a communication facilities, and damage assessments. The ranges at which target data would have to be acquired, as well as the accuracy and frequency of update requirements would likely differ substantially from the Southeast Asia experience, owing to a combination of environmental, conflict intensity, and space/time factors differences. If this is so, a substantial question arises as to the impact which such differences would have on the efficiencies of prevailing collection means; that is to say, would such current inventory items as SLAR and FLIR, for example, be more, less, or equally efficient in either Europe or the Middle East? What of the expected efficiencies of HUMINT and SIGINT systems? None of these questions can be answered absolutely based on the exploratory analysis possible within the scope of this study. However, the experience of Israeli forces in the June 1973 war, wherein a number of tactical intelligence collection means of US design were employed, as well as a large body of operational test data for US systems under Central European environmental conditions, offer some indications of prospective utility and efficiency.

5.3.1 Criteria for Assessing Utility and Efficiency

(U) A major gap in existing documentation on the various means of tactical intelligence collection is the lack of standardized criteria for measuring utility and efficiency. To be sure, all sensor systems, for example, are designed to specified performance standards for range, resolution, location accuracy, etc, but each equipment item or system tends to be designed and thus to perform more in accordance with technical feasibility or "state-of-the-art" limitations than with uniform criteria reflecting intelligence mission needs at different levels of tactical command. In the absence of an accepted set of standards for assessing either the utility or efficiency of individual collection means or collection systems, it is most difficult to compare one means with another, let alone construct a comparative estimate of means and systems effectiveness under dissimilar conflict environmental circumstances.

(U) However, for purposes of assessing the prospective utility of prevailing collection means and systems under likely circumstances of employment in Europe or the Middle East, it is possible on the basis of Southeast Asia experience to posit a number of generalized criteria which may be used to formulate inferential judgments. Relevant criteria appear to comprise the following:

Timeliness — whether individual collection means or combination of means employed as a system satisfy commanders' intelligence needs within the margins of time available for effective action against priority enemy targets.

Responsiveness — whether individual collection means or combinations employed as a system satisfy commanders' intelligence needs as defined by the operational situation to which their forces are committed. That is to say, if the operational situation requires that tactical intelligence be acquired within a roughly circular area of a division location, are the means capable of so performing or is means performance geared to the traditional concepts of positional warfare along a well-defined line of battle?

All-weather — whether collection means and systems perform effectively under all-weather conditions or whether and to what extent performance is degraded by cloud cover, rain, dust, mist, haze, extremes of temperature, etc.

Continuous Coverage — whether collection means and systems are capable of performing without interruption, 24 hours a day, or whether coverage is limited to daylight hours.

Detection Probability — whether collection means and systems consistently detect a useful fraction of the enemy targets actually within a command area of interest and sought by the command.*

Accuracy — whether a collection means or system can identify targets to a degree of accuracy commensurate with the capabilities of available strike systems.

Range — whether a collection means or system performs to the limits of the command area of interest, or whether performance is degraded by terrain, vegetation, technical limitations, or other factors.

Vulnerability — whether a collection means or system performs acceptably under conditions of enemy attempts to destroy, deceive, or otherwise neutralize its operational capability.

(S) *NATO criteria set this value at 50 percent. See Long Term Scientific Study on Reconnaissance, Detection, and their Integration with Command and Control (U), NATO Document AC/243 (LTSS) D/16, July 1973. NATO SECRET

5.3.2 Assessment of Collection Means

(C) The foregoing criteria, while admittedly very general, can, however, be made to serve as a foundation for comparing the validated experience of Southeast Asia with partially validated experiences in the Middle East and Europe. The term "partially validated" is used to signify (1) Israeli experience in employing hardware collection means of US design and manufacture against Arab forces, (2) Israeli experience with non-hardware systems employed in a manner generally consistent with US tactical intelligence doctrine and organization, and (3) US and NATO-allied experience with various collection means in experimental configurations in the European Central Region.

(U) Table 5.4 shows the results obtained by applying these criteria to known data concerning collection means performance under different conflict environmental circumstances in Southeast Asia, Central Europe, and the Middle East. In many instances the assignment of values to individual collection means in given settings is somewhat arbitrary because of ambiguities in the evidence. In such cases, however, final selection was made on the basis of informed judgments as to the direction in which the weight of the evidence tends to point.

(C) Table 5.4 divides collection means into three major groupings, viz., SIGINT, SENSORS, and HUMINT. The principal collection assets by type, pertinent to each category, are evaluatively displayed for the three regions considered.

(S) SIGINT. The essential components of SIGINT are radio direction finding (ground and airborne DF) communications intercept (COMINT), and electronic intercept (ELINT). Insofar as the potential usefulness of SIGINT in Middle East operations is concerned, it is clear from Israeli experience during the October 1973 war that it would probably continue to rank as one of the most important sources of timely and responsive intelligence in operations against local national forces, but might prove somewhat less effective against Soviet forces with capabilities more advanced than those of Arab national armies. The latter evaluation applies especially to Central Europe where a combination of factors would probably operate to make SIGINT collection more difficult than in

Table 3.4 (S)

USEFULNESS OF COLLECTION MEANS (U)

Collection Means		Region of Operations		
		Southeast Asia[a]	Middle East[b]	European Central Region[c]
SIGINT	COMINT	2	1	1
	Airborne DF	1 (2)	1	1
	Ground DF	[illegible] (2)	1	1
	ELINT	3 (1)	1	1
SENSORS	Unattended (UGS)	1 (2)	2	2
	Surveillance radars	3 (2)	1	1
	LLTV	2	2	2
	Starlight Scope	2	2	2
	NOD (active-passive)	2	2	2
	Photography	2 (1)	2	2
	FAC	1	2	2
	SLAR	3	1	1
	IR	3 (2)	2	2
	Sniffer (APDS)	3	3	3
HUMINT	Units in contact	1 (2)	1	1
	LRRP	2	2	3
	Air cavalry	1 (2)	2	2
	SOG	2	2	2
	Other Friendly Patrols	2 (1)	2	1
	Prisoners (IPW)	1	1	1
	Ralliers (Chieu Hoi) and civilians	1	1	2
	Agents	1	2	2
	Documents	1	1	1

[a]Ratings for Southeast Asia are based on tactical commander's assessments as recorded in Table 3.6. When this assessment varies between main force warfare and other kinds of operations (e.g., pacification, air interdiction campaigns) the usefulness ratings for the latter are provided in parenthesis.

[b]Ratings for Middle East derived mainly from: DIA, Joint Operational Intelligence Team Final Report (U), DIA-DC, 1974 (SECRET) and GRC, Project Tenet II, "An Assessment of the 1973 War on Soviet Doctrine, Tactics and Materiel, Vol. II, Main Report," OAD-CR-117, July 1975, (SECRET).

[c]Ratings for Central Europe derived from: HQ, USAREUR, ODCSOPS, Project Avid Guardian Special Study Group Final Report (U), 5 July 1974 (SECRET); NATO, Long-Term Scientific Study on Reconnaissance, Detection, and Surveillance and Their Integration with Command and Control (U), NATO Document AC/243 (LTSS) D/16, July 1973 (NATO SECRET).

Key: 1 = Always, 2 = Sometimes, 3 = Seldom.

Southeast Asia. These factors are: (1) a much denser signal environment for Soviet forces; (2) better Soviet communications disciplines, equipment, and codes; (3) the susceptibility of SIGINT systems to deception, for which Soviet forces possess a much greater capability than did enemy forces in Southeast Asia; and (4) heavy use by Soviet forces of advanced and effective electronic warfare capabilities for which they have numerical superiority in equipment. Because of its unique nature, however, SIGINT will always be useful to the extent that collection efforts are able to penetrate or otherwise offset Soviet defensive measures.

(C) SENSORS. Sensor technology is applied in ground and airborne modes. Airborne sensors comprise radars, infrared, image intensifiers, condensation nuclei detectors ("sniffers") and photography. Human vision also qualifies as an airborne sensor system. Ground sensors include unattended ground sensors (UGS), radars, and image intensifiers. These sensor systems were all used in Southeast Asia with varying degrees of success, depending on area of employment and operational context.

(C) Airborne Sensors. In the aggregate, the most useful airborne technique in Southeast Asia was visual reconnaissance, especially by forward air controllers (FACs). Photography was also one of the most useful collection means in this category despite the limitations of heavy vegetation and periodic adverse weather. SLAR, IR, image intensifiers, and sniffers were generally less useful than either direct observation or photography, but made timely contributions to target detection and acquisition in many instances under favorable weather.

(C) Considerable doubt exists about the operational usefulness of some airborne sensor systems in combat environments characterized by heavy air defenses. Vulnerability of some sensor systems to ECM, vulnerability of their platforms to air defense weapons, and limitations imposed by weather, terrain, foliage, night, line-of-sight transmission problems, and other factors will definitely degrade performance below the level of effectiveness achieved in the relatively permissive environment of Southeast Asia. Improved systems performance resulting from technological advances such as RPVs, increased stand-off range and discrimination, as well as refinements in tactical applications associated with nap-of-the-earth flying and pop-up techniques may lessen the impact of physical environmental constraints and enemy defenses, but mission performance will probably still fall short of Southeast Asia levels, especially for low-flying slow-movers of the sort represented by Army platforms.

(S) Israeli experience with airborne sensor systems in the October 1973 war is instructive in this regard. Israeli capabilities in that conflict comprised mainly the reconnaissance surveillance systems embodied in the RF-4E, Mirage-IIIC, and Ryan-124I drone platforms. Primary reliance was placed on RF-4E photo systems at high altitude (50,000-60,000 ft) standoff (20NM) distances). The RF-4E IR system was not used owing to poor resolution capability and requirements for a very low altitude flight profile. Drones were used at low, medium, and high altitudes, i.e., 500-50,000 ft. The RF-4E's and drones generally returned excellent imagery but the cycle time required to fly the missions, to recover, process, and interpret the imagery, distribute hard copies, and mount ground or air strikes against identified mobile targets was much too long. In most instances, the Arab targets had displaced before Israeli strike capabilities were activated. For this reason, the Israeli army and air force have expressed serious interest in acquiring improved capabilities, comprising platform-mounted SLAR, FLIR, and LLTV, which would be data-linked to ground terminals to provide readouts in near-real time. The Israelis realize that such systems would sometimes have to be employed at standoff distances against the high AAA and SAM threat presented by ARAB forces. US operations against Soviet or Arab main forces would face similar obstacles.

(S) Israeli airborne sensor capabilities are, of course, more limited than US capabilities, especially in standoff applications. Airborne radar, with an all-weather standoff capability, should have more utility in Europe and the Mid-East than it did in Southeast Asia, owing mainly to its capability to detect vehicular movement, which was not a primary requirement throughout most of the period of US ground operations in Southeast Asia. Airborne infrared systems of the type used in Vietnam, on the other hand, will have limited usefulness because of the time required for processing the information collected. The use of IR tied to a target acquisition and reaction system, e.g., FLIR in a gunship, however, could find useful application. With regard to the condensation nuclei detector systems ("sniffers") used in Southeast Asia, there is little reason to expect that they will find a major application in the kinds of conflict expected in Central Europe or the Middle East — except perhaps in counter-guerrilla operations in the latter area.

(S) Overall, it must be expected that variabilities in terrain masking and weather (especially in Central Europe) and the inhospitable air defense environment likely to be encountered in operations against Soviet and Soviet-equipped forces in Central Europe and the Middle East would operate to degrade the performance of all airborne sensor tactical intelligence collection systems. In particular, the constraints imposed by heavy air defenses would have the effect of placing a premium on airborne resources capable of acquiring tactical intelligence from standoff distances. Aerial platforms different from those in general use in Southeast Asia will probably be required to achieve useful results for some systems, especially photography. Moreover, the usefulness of aerial photography to tactical commanders will be more than ever dependent on cycle time (from time of request to receipt of data) because of the mobility capabilities of enemy forces.

(C) Ground sensors. In Southeast Asia, ground sensor systems were used with varying degrees of success. UGS proved useful in the air interdiction campaign in Southern Laos (both in targeting and in BDA); in defending strong points against enemy main force assaults (e.g., Khe Sanh); and in monitoring enemy infiltration and maneuver through wide expanses of rugged, jungled terrain. Ground surveillance radars and various darkness-penetrating, electro-optical devices were generally useful in defensive applications, but surveillance radars almost never contributed to offensive operations against enemy main forces.

(S) Israeli combat experience with equivalent ground sensor systems in the October 1973 war was limited. UGS were not used, and ground surveillance radars, primarily the PPS-5, saw only limited employment mostly in an anti-infiltration role against guerrilla groups. Electro-optical devices (LLTV and image intensification binoculars) were used at front line observation posts with good results. The effectiveness of such systems in the hands of US forces should be equally as good.

(S) The prospective utility of ground sensor systems of the Southeast Asia-type (or derivatives) to US forces in either Central Europe or the Middle East is likely to be greater than for airborne sensor systems, primarily because of lesser vulnerability. Nonetheless, major problems remain. Surveillance radars will face sophisticated countermeasures including deception, jamming, and antiradiation missiles, and performance will be degraded by operator fatigue, line-of-sight limitations, and excessive clutter in the urbanized environment of Central Europe. UCS, if integrated beforehand into theater surveillance capabilities in Europe, may prove vulnerable to interdiction of airborne or ground-based data relays, but they do offer the potential for all-weather, continuous collection at extended ranges, and within the constraints of time which will have to be met at every level of tactical command. Opportunities for tactical applications by US forces in the Middle East would be abundant but effectiveness would depend on prior development of operational capabilities for employment within the command structure contemplated for Middle East operations. In both the Middle East and Central Europe, it seems clear that ground sensor capabilities will need to be tailored to specific requirements of the operational situations anticipated.

(C) HUMINT. HUMINT collection means comprising ground and air-cavalry patrols, prisoner interrogations, agent reports and document translations were among the most productive sources of timely and accurate intelligence on enemy strength and unit locations in Southeast Asia. HUMINT overall should prove to be equally inportant in operations in Central Europe and the Middle East.

(S) Not surprisingly, and except for air cavalry patrols for which Israeli forces possessed no capability, HUMINT was vital to Israeli intelligence production during the October 1973 war, rivaling SIGINT in importance at brigade, division, and area command levels in terms of timeliness, responsiveness, and accuracy. One of the major strengths of Israeli intelligence is its centralized and professionally staffed and managed HUMINT collection organization.

(C) In a very real sense, however, Israeli experience in the Middle East is not validly comparable to US experience in Southeast Asia where the US HUMINT system was required to function in harness with the host-country and other allied structures of lesser capabilities. Should the need arise to commit US forces to combat in the Middle East, it is probable that they would be required as much to augment the capabilities of such friendly governments as Iran and Saudi Arabia against Russian-supported enemy forces as to assist in the defense of Israel. Hence, there may again be a need for time to develop agreements governing the collection, processing, evaluation, and dissemination of intelligence. This requirement, together with heavier ground and air defense environments, suggests that ground patrols, air cavalry and special operations assets would be no more effective than in Southeast Asia. Agents could prove even less useful, mainly because of the time required to develop productive nets.

(C) In Central Europe, where HUMINT would also necessarily play a vital role in a future conflict, the prospects are somewhat less bleak. The basic infrastructure arrangements for joint and combined intelligence operations are well-established within NATO, and the defending national forces in the Central Region (i.e., UK, US, and FRG) possess professionally-qualified intelligence staffs who are experienced in working together. The principal difficulties which HUMINT collection systems will face in Central Europe will be: (1) the limited range of ground patrols in fluid tactical situations, (2) agent vulnerability to enemy counteraction, (3) increased vulnerability of air cavalry patrols to enemy counteraction at levels well above those encountered in Southeast Asia, and (4) the prospect of fewer defectors from well-trained and disciplined Soviet forces. Prisoner interrogations should prove as fruitful as in Southeast Asia. Whereas in Southeast Asia the interrogation process was often focused on longer-term tactical intelligence needs (e.g., COSVN planning), in Central Europe and the Middle East the emphasis will probably be on information of immediate tactical value in the faster moving battlefield situations. There will very likely be, in fact, a premium on information from PW interrogation at lower tactical levels

(S) Captured documents were an excellent source of intelligence in Southeast Asia at many levels and for multiple purposes. Israeli forces also valued captured documents for immediate and longer-term uses. They would without doubt be similarly useful to US forces in the Middle East and in Europe.

(C) The keys to successful document exploitation are organization for the effort and trained personnel who know what to look for, how to recognize it, and how to turn it to tactical advantage. As in the case with other HUMINT systems, however, US forces if committed to operations in the Middle East in support of friendly powers would probably face a Southeast Asia-type situation insofar as the need to develop joint and combined document exploitation capabilities is concerned. This need would not obtain for Central Europe because of the existence of the essential infrastructure.

5.4 IMPLICATIONS OF SOUTHEAST ASIAN ORGANIZATION AND MANAGEMENT LESSONS

(U) From the point of view of intelligence readiness and the capability to take immediate and effective action in future contingencies, perhaps the most important lessons from US tactical intelligence experience in Southeast Asia relate less to the relative effectiveness of various intelligence collection means and the application of advanced technology to solve intelligence collection problems than to the planning, organizational and management functions which determine the availability and use of those intelligence resources.

5.4.1 Tactical Intelligence Planning

(U) Initial Intelligence Data Base. As noted earlier, US tactical forces entered into operations in Southeast Asia with almost no intelligence data base in their hands on the area, the people, or the enemy. It is clear that the wherewithal for such a data base existed. US advisory forces had been in South Vietnam since 1954. The French had accumulated a massive amount of material on the Viet Minh and their areas of operations. So had the South Vietnamese Government. The problem undoubtedly was the lack of organizational commitment for this task and the lack of qualified personnel available to assemble in usable form and from a variety of sources, an intelligence data base that could be readily exploited by US deployed units. As a consequence, the data base had to be painstakingly assembled during the early period of US operations.

(U) In future contingencies, it is unlikely that, in areas other than Central Europe (where the posture of US forces requires a high level of intelligence readiness), there will be time for the collection and assembly of basic intelligence data needed to support initial operations and intelligence analysis. The basic data required at the outset of operations (e.g., information on terrain, weather, local government, local and enemy forces, etc.) will undoubtedly exist within the intelligence community. The key requirement as in Southeast Asia, will be its assembly into a form usable by and readily available to US deployed forces.

(U) Preconflict Intelligence Analysis. Similarly, US ground forces entering into operations in Southeast Asia, did not have the advantage of preconflict analysis of potential tactical intelligence needs or an adequate assessment of the relative utility of alternative collection means or mix of means. The failure to undertake such analysis in advance, while not disastrous in Southeast Asia because of the time available for the phased deployment of US forces, could have serious consequences in conflict situations of the type likely to occur in the Middle East, for example. As indicated earlier, the combat enviornment in such contingencies will be characterized by different time/space factors, target densities and mixes and will require rapid response, frequent updating and great accuracy in intelligence operations. Effective intelligence planning for such future conflict contingencies, therefore, should include detailed analysis in advance, based on realistic scenarios, of likely intelligence requirements and the development of intelligence collection plans (in advance) which employ the best mix of available collection means to fit the particular situation.

5.4.2 Intelligence Organization

(U) A number of organizational, or organization-related issues surfaced in the course of US operations in Southeast Asia which can be expected to arise again when US forces are required to conduct combat operations elsewhere. Among these are: the organizational structure for carrying out joint intelligence functions within the theater of operations and for working with Allied and friendly government forces; the level of assignment of trained career intelligence personnel; and the problem of how best to integrate intelligence and operational planning.

(U) Joint and Combined Intelligence Organizations. Chapter 4 describes the intelligence organizational structure that evolved over time in Southeast Asia. One essential requirement that had to be met was an organization capable of uniting and integrating US and allied intelligence collection and analysis efforts. In Vietnam, the intelligence available from RVN sources was essential to the prosecution of the war. At the same time US-developed intelligence had to be shared with local and allied forces.

(U) The same requirements will arise in future contingency situations where US forces are allied with friendly governments or are called in to support the operations of a friendly government. When this happens either in the Middle East or elsewhere, they must be prepared to develop effective working relationships with the intelligence organizations of that government and develop an intelligence structure (and procedures) capable of accommodating that need. The Joint and combined intelligence organizations that evolved over time in Vietnam (e.g., the DIOCC/PIOCC system and the Combined Intelligence Center organization) seemed to have met that challenge and to have achieved satisfactory levels of performance. As a consequence they should serve as a starting-point model for US intelligence contingency planning for future conflict situations.

(U) It should be noted, however, that the organizational structure finally arrived at in Southeast Asia was the product of experiment and innovation applied to requirements posed over time. While it is probable that the general outline and some elements of the required organizational structure can be specified in advance, the problems encountered in working with allies are likely to be "situation-specific" and will have to be worked out on the spot by knowlegeable people sensitive needs and capabilities of the allies in question. It might also be noted that, even in the case of US joint intelligence activiites in Southeast Asia, procedures and organizational concepts that existed in joint doctrine, had to be particularized for the local situation.

(U) Assignment of Trained Intelligence Personnel. In part because of the shortage of trained career intelligence personnel, but also for reasons of traditional practice, trained intelligence personnel were seldom assigned to tactical echelons at Division and below during the early period of US operations in Southeast Asia. As indicated in Chapter 4, however, the importance of the intelligence function at these levels proved to be such that former battalion, brigade and division commanders were in overwhelming agreement that a solid requirement exists for professionally trained intelligence personnel at these levels. Some noted that this reflected a reversal of opinion from views held before entering on operations in Southeast Asia.

(U) The importance of effective intelligence and the targeting requirements that can be anticipated in contingency operations in the Middle East and Central Europe suggest the need—perhaps to an even greater extent than in Southeast Asia—for the presence of qualified intelligence personnel at these lower tactical levels. If this is accepted, contingency planning will need to take into account the requirement for the assignment of qualified intelligence personnel to G-2/S-2 billets at Division and below and Military Intelligence Branch capabilities be maintained at levels adequate to support that requirement.

(U) Integration of Intelligence and Operational Planning. Operations in Southeast Asia, which as indicated earlier were highly dependent on and often determined by the availability of useful intelligence, demonstrated the need for the rapid and effective integration of intelligence with the operational planning process. To meet this requirement, Tactical Operations Centers (TOCs) were instituted over time to pull together essential G-2/G-3 functions at the Battalion/Brigade and Division levels. This organizational device seems clearly to have improved the evaluation and dissemination of targeting information to tactical commanders and to have facilitated the integration of intelligence with operational planning.

(U) The time/space factors, the tempo of warfare and the target rich environment that can be expected in conflict situations in the Middle East and Central Europe will heighten this requirement. Contingency planning for such conflict, therefore, should contemplate the use of TOCs or TOC-like organizations for meeting this need at the Division, Brigade and Battalion levels.

5.4.3 Intelligence Management and Resource Allocation

(U) Reduced Tactical Intelligence Cycle Time. In the target-poor operational environment of Southeast Asia, the primary purpose of intelligence collection from the point of view of tactical commanders was to produce targets for immediate combat response. Tactical commanders in Southeast Asia were generally critical of the length of cycle time required to meet their intelligence needs. Among the reasons given were:

- An upward, as opposed to downward, thrust in the intelligence process resulting from a greatly increased demand for detailed knowledge of operations and, in some cases, approval of specific types of operations at theater and the national level, which requirements tended to inhibit the timely lateral and downward flow of intelligence.

- The control of selected (but key) intelligence collection assets at higher command echelons and the perception on the part of tactical commanders that those collection means for which control was exercised at or close to those levels where strike actions were initiated tended to be most effective (and timely) in meeting their intelligence needs.

(U) With regard to the latter, certain collection assets were capable of serving both tactical target development and longer-term planning needs. Collection assets that were few in number, expensive to field and maintain or security-sensitive, moreover, tended to be controlled at levels two or three echelons above that at which tactical response was normally taken. Given this, it is not surprising that in some cases information which might have been of value for targeting purposes was not received at the lower tactical echelons in time for effective strike action.

(U) What is clear from the analysis is that tactical commanders desired, and felt that they required, immediate readout of relevant target information on their areas of interest. It is also clear that collection systems which were directly coupled with reaction-strike capabilities, in near-real time, were most effective in satisfying tactical commanders' intelligence and targeting needs. With respect to the echelon of control issue, however, the Southeast Asian experience suggests there is no single solution. The appropriate echelon of control for different collection assets necessarily is a function of such factors as the requirement for processing and interpretation, restrictions related to security and counterintelligence and the number of such assets available (the allocation problem) as well as proximity to the level which has the capability and authority to respond. While the former may impact adversely on timeliness, they are realities that have to be considered.

(U) These lessons will also apply in future contingencies in such areas as the Middle East and Central Europe where the denser target environment and range and lethality of weapons likely to be encountered will demand that intelligence cycle time be reduced even further. In particular, it will be important that the intelligence collection process be able to extract out what is useful for immediate targeting purposes and transmit such information as quickly as possible to the tactical action levels. To accomplish this in the case of collection assets that collect intelligence information for operational planning purposes and which also can produce output of value for targeting purposes in near real time, a dual information processing and dissemination capability may be required. This applies to the HUMINT area (e.g., PW interrogations) as well as such collection means as airborne sensors and COMINT. In addition, the target risk environment likely to be encountered in these contingencies will pose special problems in target selection (i.e., target priorities and analysis of the target mix) and the choice of appropriate response. To meet these requirements of dual information flow, target selection and target assignment, improved data processing systems to handle the output of advanced collection systems and improved data links to appropriate echelons for quick read-out may be necessary.

(C) Security and Counterintelligence. Security considerations relative to intelligence operations were an important concern in Southeast Asia. On the one hand, security controls on sensitive source intelligence, in the early stages of US operations in Southeast Asia, sometimes operated to deny tactical unit commanders access to intelligence which they considered vital. This was particularly true of "perishable" intelligence associated with targeting. In the case of SIGINT intelligence, as indicated in Chapter 4, provisions later in the period of US operations which authorized clearances for more personnel at division and brigade levels and the increased flow and availability of collateral SIGINT information to tactical commanders largely ameliorated this problem.

(U) On the other hand, US and allied operations in Vietnam were peculiarly vulnerable to enemy intelligence penetration. Perhaps the most serious (and difficult) security problem faced in Southeast Asia was the protection of sensitive intelligence information relating to operational planning that involved combined operations with local government forces. Requirements for prior coordination of ground operations, artillery employment, and air strikes with Vietnamese units or local officials often resulted in warning to VC or NVA forces of planned actions.

(U) Security considerations will continue to be a major concern in contingency operations in the Middle East and Central Europe where US forces will be working with allied and local friendly forces and where local civilians are in close proximity to (and may work for) US units and headquarters. Communications security on the part of US units and personnel will be especially important because of the COMINT capabilities possessed by opposing forces. The Southeast Asian experience, however, also suggests that security measures, when applied too rigidly to the dissemination of sensitive source intelligence, can inhibit the timely and downward flow of such intelligence to tactical echelons which require relevant target information on their areas of interest.

5.4.4 Personnel, Training and Intelligence Readiness

(C) The US intelligence effort in Southeast Asia suffered initially from the lack of readily available combat intelligence personnel and intelligence specialists. The CONUS resource base could provide only a few officers fully qualified to perform G-2/S-2 combat intelligence duties, as posed in the context of joint and combined operations in Southeast Asia, and only a modest number of specialists in the various intelligence disciplines were available. The immediate requirement therefore was to organize, train and commit needed intelligence units as quickly as possible. For a considerable time, however, intelligence personnel assigned to Vietnam arrived undertrained and generally lacking in area qualifications and experience. Particularly felt were shortages in key specialist areas, e.g., photo and other image interpreters, communications intercept and traffic analysis personnel, order of battle specialists, PW interrogators, technical equipment analysts, document translators, etc. These capabilities had to be developed over time and some requirements were never satisfactorily met.

(C) The implications of this aspect of the Southeast Asia experience for future contingency situations in which US forces may become involved are serious. The resource base for combat support functions, especially when that base includes specialists and technically trained personnel, tends to erode in peacetime. Resource limitations (on schools, active space, etc.) impose severe constraints on the extent to which an active base can be maintained capable of dealing with the entire range of contingencies. Intelligence personnel needs for the kinds of contingencies considered in this exploratory analysis, however, will be as, if not more, extensive than experienced in Southeast Asia. This will be especially so with respect to intelligence specialist personnel, e.g., those involved in imagery interpretation, SIGINT operations or working with data processing and data link equipment. In future contingencies of the kind likely to arise in Central Europe and the Middle East, there will be even less time than was the case in Vietnam for the recruitment and training of such personnel.

(U) This points up the need to maintain in the existing force structure a trained cadre of intelligence personnel that can provide initial inputs for future contingency operations and a resource base upon which ultimate intelligence force requirements can be built. This peacetime resource base will need to include both combat intelligence generalists who are qualified to fill G-2/S-2 billets and serve as intelligence process managers, and specialists (officers and enlisted men) to cover the range of key intelligence specialist functions.

(U) How to maintain these intelligence assets in a high state of training and readiness and how to store them in the system until the time of need are questions that will need to be addressed by intelligence resource managers if an adequate state of readiness for future contingencies is to be achieved. In the case of intelligence training, for example, the tendency in peacetime is more toward "theater" level intelligence operations than tactical. It may be necessary to develop more realistic training practices that utilize opportunities presented by CPXs and maneuvers and by short term attachment to tactical echelons of intelligence personnel assigned to theater level organizations overseas. For maintaining an adequate base of area and language qualified personnel, reliance may have to be placed on ways to capitalize on FAST-type programs, the Defense Language Schools and the Defense Attache system in such contingency planning. Whatever the solutions, the Southeast Asia experience suggests that the maintenance of a trained resource base of intelligence personnel together with a master plan for the expansion and development of needed intelligence assets will make the single most important contribution to intelligence readiness for future contingency operations.

KEY PERSONNEL INTERVIEWED

KEY PERSONNEL INTERVIEWED

Name	Present Assignment	SE Asia Assignment
MG J.W.Barnes	USA Ret.	Deputy Senior Adv II Corps; CG Americal Div (68-70)
COL John A. Bender, USA	JCS-J3	3d Bn of 22d, 4th Inf. Div. (1966-1968)
COL R.C.Berkeley	USMC Ret.	Head of Special Activities Branch of Phun Hoang, Directorate of Pacification Program
BG D.D.Blackburn	USA Ret.	Former CO Special Operations Group
LTC R. W. Bomberger	USA Ret.	Dep. Sen. Advisor, RVN Airborne Div. (1968-1969)
COL Lee A. Burcham	USAF Ret.	Chief Trgts TFA (Oct 68-Jan 69); Chief Trgts Div Hq MACV (Jan 69-Oct 69)
LTC Alan C. Chase, USAF	Hq USAF/RD Recce Pgm Element Monitor	RF4C Acft Cdr UDORN RTAB, Thailand (68-69)
COL R. W. Clarke	USAF Ret.	Dep Dir Technical Operations; Task Force ALPHA NP AFB, Thailand (68-69)
BG W. L. Clement	USA Ret.	ADC Americal Div; Dir Trng Hq MACV (1968-1970)
COL James P. Coley, USA	JCS-J5	CO, 31st Inf Dv;196th Inf Bde, VN
COL C. H. Curtis	USA Ret.	Bde. Cdr (68-69)
LTG P.B.Davidson	Dep.Asst.Sec.ASD-I	J-2 MACV
COL Bryce F. Denno	USA Ret.	Sen Adv I Corps DANANG VN (June 62 - June 63)
CAPT Robert A. Dowd	USN Ret.	US Navy Intelligence, Vietnam (1966-67)

Name	Present Assignment	SE Asia Assignment
LTG Julian J. Ewell	USA Ret.	CG 9th Inf Div Saigon (Feb 68-Apr 69); CG II FFV, III Corps Area (Apr 69-Apr 70)
MAJ David P. Fowley	USAF Ret.	Staff Intell Off Hq MACV (Jun 68-Jul 69)
LTC B. R. Fuller, III, USAF		333d TAC FTR SQ (WILD WEASEL) RTAF TAKHLI Thailand (Feb 67-Sep 67)
MG Marshal Garth, USA	DCSOPS-DOMS	Bde Co 4th Div & several other assignments VN
LCDR T.E.Grabowski, USN	SEAL/UDT OFF NAV Inshore Warfare	Several tours in SEAL Ops VN
LCDR A.D.Grace, USN	CINCPACFLT	Navy Intelligence Liaison Officer (1969-1971)
COL C.E.Granger, Jr., USA	DCSOPS-DA	Dep Bde Cdr 3d Brig TF 25th Inf Div (Jan 66-Nov 66) ACofS G3 Task Force Oregon (Americal Div) (Dec 66-Jul 67)
BG Michael J.L.Greene	USA Ret.	Ex Asst to CO MACV (Feb 63-Jun 64); Sec J.Staff Hq MACV (Jul 64-Jun 65); Asst Div Cdr 25th Inf Div (Jan 70-Dec 70)
COL R.G.Jones	USA Ret.	Staff Cords MACV (1967) Dir Chieu Hoi and Pacification (68-69); Dep of VN Trng under corps (70-72)
LTG J.J.Hennessey, USA	Chief Off of Res Components DA	1st Cav Div, Americal Div, 101st AB Div
LTC J.F.Holcomb	USA Ret.	Dep CO 1st Bde; 1st Cav Div VN (Nov 69-Jul 70); DIA (Jul 70-Sep 71)
COL J.R.Johnson	USAF Ret.	Dir Tech Operations Task Force Alpha NKP AFB Thailand (Oct 67-Apr 69)

Name	Present Assignment	SE Asia Assignment
MAJ Fred F. LaMarca, USAF		VN as Senior US Advisor of Interrogation Center Saigon (1965)
MAJ R.A.MacDonald, USMC	Marine Aide to CNO	MAR Liaison Off COMNAVFORV
MAJ B. P. Mandich	USA Ret.	CIA (1964-73); Spec. Forces CIC (1942-64)
LTC R. L. Mendenhall	USA Ret.	Sensor planner, Vietnam (1967-68)
COL G. C. Morton	USA Ret.	Special Forces Commander, Vietnam (61-63); CIA-SE Asia (67-72)
1LT R. W. Mushal	USA Ret.	525 MIGP (Sep 68-69); G2 Advisor Team 86 MACV (Sep 69 - Jul 70)
LTC J. J. Nelson	USAF Ret.	Corps Air liaison off. VN (1970-71)
COL W.V.Ochs,Jr.	USA Ret.	Bde. CO VN (Feb-Mar 70); Sen Advisor ARVN Div VN (Mar 66-Mar 67)
LCDR Earl Pajari, USN	CINCPACFLT	Navy Intelligence Liaison Officer (1969-70)
COL C.J.Peabody	USMC Ret.	AC/S G-5 III MA PHIBFOR VN (Sep 69-70)
LTG W.E.Potts, USA	USA Ret.	G-3 USARV (March 65 - Aug 66) J-2 MACV (Feb. 69 - Sep 72)
RADM E.F.Rectanus,USN	Dir of Naval Intel	Chief, ACoS Intel Hq COMNAVFORV (1968-1971)
Dr.Robert N.Schwartz	Tech Adv Net Assessment to DACS Studies & Analyses USAF	7th AF, Chief Ops Anal
LTC R. F. Seaton, USAF		Bde. Air Liaison Officer, 1st Brig 9th Inf (Sep 66-Mar 67); FAC "Tally Ho" Dong Ha (Apr 67-May 67)
BG H.J.Schroeder	USA Ret.	CO 1st Inf Div Arty, (Aug 67-Aug 68); GG II FF V Arty (Sep 68-Feb 69)

Name	Present Assignment	SE Asia Assignment
Dr. Thomas Thayer	Off of Dir of DEF Prog Anal & Eval	ARPA Fld Unit VN, Off Asst Sec Def for Systems Analysis
COL Edmund R. Thompson,USA	DCSPER DA	G-2 25th Div
MG Rockly Triantafellu	USAF Ret.	Dir Intel 2nd Air Div 7 AF SVN (Mar 65-Jul 66) Dir Intel Hq PACAF (Aug 66-Jul 69)
LTC J.J.Turner, USA	DIA	Prov.Sen Adv VN (70-72); Dist Sen Adv VN (66-67)
MG E.W.Williamson	USA Ret.	CG 173d Airborne Bde (1963-1966); CG 25th Inf Div VN (1968-1969)

QUESTIONNAIRE
ON US TACTICAL INTELLIGENCE EXPERIENCE
IN SOUTHEAST ASIA

QUESTIONNAIRE ON TACTICAL INTELLIGENCE EXPERIENCE IN SOUTHEAST ASIA

I. GENERAL

A. Name: ____

B. Primary Assignments, Dates, and Geographical Locations:

____

____

____

____

____

C. General Guidance:

You are encouraged to respond to all sections of the questionnaire relevant to your experience. Please check whether that experience primarily covers:

1. Operations against enemy Main Forces primarily in remote jungle (e.g., war zones or sanctuaries? _____

2. Pacification operations in densely populated areas? _____

3. Interdiction campaign operations in border and cross-border areas? _____

II. OPERATIONS AGAINST MAIN FORCES

A. Tactical Intelligence Needs

1. Rate the following items in descending order of importance (1-X) as to their place on a scale of priorities for the planning of operations against enemy Main Force units. If two or more elements were of equal importance, assign them the same value. If any element was of no importance, rate it as zero.

    Composition of Enemy Forces (units by type)
    Unit Strengths
    Unit Locations
    Weapons
    Supply (levels/stockages) Situation
    Command Subordination
    Command Personalities
    Offensive Combat Capabilities
    Defensive Combat Capabilities
    Communications Capabilities
    Intentions
    Terrain and Vegetation
    Weather
    Local Population Factors
    Potential LZ and DZ
    Any Others (please list and assign values)

2. Recognizing that combat operations are not necessarily initiated with the benefit of completely accurate intelligence on enemy forces, but taking into account your knowledge of the results of the operations in which you engaged, rate the following items as to the adequacy of intelligence available to you before and during the conduct of those operations.

Intelligence Was Adequate:

	Almost Always >75% of time	Often >50% <75%	Rarely <50% >25%	Almost Never <25%	Not an Important Item
Enemy Forces:					
Composition					
Strength					
Unit Locations					
Weapons					
Supply Levels/Stockages					
Command Subordination					
Command Personalities					
Offensive Capabilities					
Defensive Capabilities					
Communication Capabilities					
Intentions					
Terrain and Vegetation					
Weather					
Local Population					
Potential LZ & DZ					
Others (please list)					

B. Tactical Intelligence Collection Means

1. It has been alleged that tactical intelligence collection in Southeast Asia ranked toward the lower end of a scale of adequacy for combat operations planning and execution. Do you agree or disagree with this allegation?

_____ Agree _____ Disagree

2. Some of the different means employed to collect tactical intelligence in Southeast Asia during the period of U.S. involvement in combat operations are listed below. Please rate them in usefulness to you in your command assignments with respect to the planning and conduct of combat operations.

NOTE: Disregard whether you acquired the intelligence by direct read-out from the source, or as an item in a daily or other periodic report from another headquarters, or by some other means (command briefing, e.g.). Commani intelligence, situation and operations reports usually identified the means by which the intelligence was originally acquired. Our interest is in the usefulness of those means to you.

Intelligence Was Useful:

	Almost Always	Often	Rarely	Never	No Access	Available But Not Used
HUMINT:						
Special Operations Patrols (MACSOG)						
LRRP (US)						
Other Friendly Ground Patrols						
Units in Contact						
Air Cavalry						
Prisoner Interrogations (IPW)						
Rallier Interrogations (Chieu Hoi)						
Agent Reports (SPAR)						
GVN Sources (PIOCC/DIOCC)						
Other HUMINT						
SIGINT:						
COMINT						
D/F						
ELINT						
SENSOR:						
Unattended Ground Sensor (UGS)						
Ground Surveillance Radars						
Image Intensifiers (Ground-based)						
a) LLTV						
b) Starlite Scope						
c) NOD (Active/Passive)						
Sniffer (APDS)						
Airborne Systems (RF-4, Mohawk, etc.)						
a) SLAR						
b) IR (Red Haze)						
c) Black/White Photo						
d) Sniffer (APDS)						
e) Ignition Detector						
f) FAC						
g) Other airborne visual						
Other Sensors (please list)						
Other Means (please list)						

REMARKS: (Explain, for each item checked, why not used.) ______________

3. Of the above listed collection means to which you had access but which were rarely or never useful to you, please enter them below in the appropriate column.

Unreliable	Untimely	Insufficient Detail	Other

4. Of the various collection means to obtain intelligence on enemy movements and dispositions in your TAOI and to which you had direct access:

   a. which did you employ most frequently? Why?

   b. which did you employ least frequently? Why?

5. Of the different tactical intelligence collection means which you knew to be available in Southeast Asia, but to which you had only indirect access or no access at all, which would you have preferred to have under your direct control?

   a. ______________

b. ______________________________
____

c. ______________________________
____

6. Why would you have preferred direct control of the assets specified in question 5?

Reason(s): ______________________________
____
____
____

7. Of the remaining tactical intelligence collection means available in Southeast Asia over which you had no control, which should have been made available to you on a regular basis by higher headquarters?

a. ______________________________
____

b. ______________________________
____

c. ______________________________
____

8. On the basis of your responses to questions 5, 6 & 7, and in the optimum situation concerning the availability of the tactical intelligence collection means considered, how should they be assigned between various echelons of command?

a. Field Force:
1) ______________________________
2) ______________________________
3) ______________________________

b. Division:
1) ______________________________
2) ______________________________
3) ______________________________

c. Brigade:
1) ______________________________
2) ______________________________
3) ______________________________

d. Battalion:
1) ______________________________
2) ______________________________
3) ______________________________

e. Company:
1)____________________
2)____________________
3)____________________

9. With overall respect to sensors and their performance, what factors would have improved their usefulness to you?

a. More target sensitivity and discrimination ________
b. More reliability ________
c. Near real-time read-out ________
d. Greater density ________
e. Other (please specify) ________
____

III. PACIFICATION OPERATIONS

NOTE: For purposes of this questionnaire, pacification operations should be considered to be those combat activities which were conducted in heavily populated areas and which had as their immediate objectives: 1) the ridding of hamlets and villages of enemy forces; 2) the elimination of the enemy's hold on the local population through the VCI; and 3) providing direct and indirect support to GVN Revolutionary Development programs.

A. Tactical Intelligence Needs

1. Enemy Forces: Rate the following items in descending order of importance (1-X) as to their place on a scale of priorities for the planning of operations against enemy forces within your TAOI. If two or more elements were of equal importance, assign them the same value. If any element was of no importance, rate it as zero.

Composition of Enemy Forces (units by type)
Unit Strengths
Unit Locations
Base Areas
Cache/Resupply Sites
Offensive Combat Capabilities
Defensive Combat Capabilities
Command and Control System
Intentions
Command Personalities
Weapons
Communications Capabilities
Infrastructure Organization
Infrastructure Strength
VCI Identities and Ages
Others (please list)

2. Other Factors - Other tactical intelligence needs in pacification operations concern local population attitudes, local friendly force capabilities (RF/PF, CIDG, PSDF, etc.), terrain and vegetation factors affecting friendly and enemy force movements, etc. Please list these and other factors which you considered important, in their order of importance to you, for planning and conducting pacification operations.

a. ______________________________

b. ______________________________

c. ______________________________

d. ______________________________

e. ______________________________

f. ______________________________

g. ______________________________

h. ______________________________

i. ______________________________

j. ______________________________

3. Recognizing that combat operations are not necessarily initiated with the benefit of completely accurate intelligence on enemy forces, but taking into account your knowledge of the results of the operations in which you engaged, please rate the following items as to the adequacy of intelligence available to you before and during the conduct of those operations.

	Intelligence Was Adequate: Almost Always >75% of time	Often >50% <75%	Rarely <50% >25%	Almost Never <25%	Not an Important Item
Enemy Forces:					
Composition of Units by Type					
Strengths					
Unit Locations					
Base Areas					
Cache/Resupply Sites					
Command Subordination					
Weapons					
Offensive Capabilities					
Defensive Capabilities					
Communications Capabilities					
Intentions					
Enemy Infrastructure:					
Organization					
Strength					
Identities and Ages					

3. (Continued)

	Almost Always >75% of time	Often >50% >75%	Rarely <50% >25%	Almost Never <25%	Not an Important Item
Terrain and Vegetation					
Weather					
Local Population					
Size					
Attitudes					
Potential LZ & DZ					
Others (please list)					

B. Tactical Intelligence Collection Means

1. It has been alleged that tactical intelligence collection in Southeast Asia ranked toward the lower end of a scale of adequacy for combat operations planning and execution. Do you agree or disagree with this allegation?

_____Agree _____Disagree

2. Some of the different means employed to collect tactical intelligence in Southeast Asia during the period of U.S. involvement in combat operations are listed below. Please rate their usefulness to you in your command assignments with respect to the planning and conduct of pacification operations.
NOTE: Disregard whether you acquired the intelligence by direct read-out, or as an item in a daily or other periodic report from another headquarters; or by some other means (command briefing, e.g.). Command intelligence, situation and operations reports usually identified the means by which the intelligence was first acquired. Our interest is in the usefulness of those means to you.

	Intelligence Was Useful: Almost Always >75% of time	Often >50% <75%	Rarely >25% <50%	Almost Never <25%	No Access	Available But Not Used
HUMINT:						
Special Operations Patrols (MACSOG)						
LRRP (US)						
Other Friendly Ground Patrols						
Prisoner Interrogations (IPW)						
Rallier Interrogations (Chieu Hoi)						
Agent Reports (SPAR)						
GVN Sources (PIOCC/DIOCC)						
Other HUMINT						
SIGINT:						
COMINT						
D/F						
ELINT						
SENSOR:						
Unattended Ground Sensors (UGS)						
Ground Surveillance Radars						
Image Intensifiers (Ground-based)						
a) LLTV						
b) Starlite Scope						
c) NOD (Active/Passive)						
Sniffer (APDS)						
Airborne Systems (RF-4, Mohawk, etc.)						
a) IR (Red Haze)						
b) SLAR						
c) Black/White Photo						
d) Sniffer (APDS)						
e) Ignition Detector						
f) FAC						
g) Other Airborne Visual						
Other Sensors (list)						
Other Collection Means (please list)						

REMARKS: (Explain, for each item checked, why not used)________________

3. Of the above listed collection means to which you had access but which were rarely or never useful to you, please enter them below in the appropriate column.

Unreliable	Untimely	Insufficient Detail	Other

4. Of the various collection means to obtain intelligence on enemy movements and dispositions in your TAOI and to which you had direct access:

   a. which did you employ most frequently? Why?

   b. which did you employ least frequently? Why?

5. Of the different tactical intelligence collection means which you knew to be available in Southeast Asia but to which you had only indirect access or no access at all, which would you have preferred to have under your direct control?

   a.

   b.

   c.

6. Why would you have preferred direct control of the assets specified in question 5?

Reason(s):______________________________

____

____

____

____

7. Again, of the intelligence collection means available in Southeast Asia, and to which you had only indirect access or no access at all, which should have been provided to you by higher headquarters?

a. ______________________________
____

b. ______________________________
____

c. ______________________________
____

8. Based on your responses to questions 5, 6 & 7, in an optimum situation concerning the availability of the tactical intelligence collection means considered, how should they be assigned between various echelons of command?

a. Field Force:
1)______________________________
2)______________________________
3)______________________________

b. Division:
1)______________________________
2)______________________________
3)______________________________

c. Brigade:
1)______________________________
2)______________________________
3)______________________________

d. Battalion:
1)______________________________
2)______________________________
3)______________________________

e. Company:
1)______________________________
2)______________________________
3)______________________________

9. With overall respect to sensors and their performance, if they were optimized to the types of targets you were looking for, would they require:

a. More reliability ____________

b. Improved real-time read-out ____________

c. Greater availability ____________

d. Other (please specify) ____________

IV. Air Interdiction Operations

An important tactical air mission is to interdict enemy combat forces, command, control and communications (C^3) capabilities and logistic support structures located to the rear of the main battle area. Execution of this mission requires the timely and systematic collection, analysis and dissemination of detailed information concerning enemy tactical operational behavior. Especially required are analyses of enemy combat and combat support systems to identify points of greatest vulnerability on which friendly air power may be concentrated to achieve maximum disruption of enemy combat support operations and to inflict maximum destruction on combat forces moving toward the front.

This section aims: (1) to identify the priority information requirements for planning and executing tactical air strikes against targets in the enemy's read; (2) to assess the adequacy of the tactical intelligence available to support the planning process; (3) to evaluate the effectiveness of the different means employed to collect intelligence for air interdiction operations; and (4) to isolate critical organizational and management considerations which either facilitated or slowed timely collection, analysis and dissemination of tactical intelligence.

A. Tactical Intelligence Needs

Listed below are a number of information categories and specific items associated with the development of tactical air targets. To the right of each item are boxes representing a 10 point scale of priorities. Please assign each item a priority rating by checking an appropriate box according to the formula 1 for the highest importance, 2 for the next highest, etc. Each item is to be rated apart from all the others as to its intrinsic importance. Therefore two or more items may be assigned the same priority rating.

Target Systems Data Needs	Priority 1	2	3	4	5	6	7	8	9	10
Enemy Rear Services	-	-	-	-	-	-	-	-	-	-
Command Organization										
Unit Hq. Locations										
Unit Strengths										
LOCs	-	-	-	-	-	-	-	-	-	-
Alignments										
Capacities (ST/D,#Men/D)										
Choke Point Locations										
Choke Point Descriptions										

Target Systems Data Needs	Priority 1	2	3	4	5	6	7	8	9	10
Enemy Tactics	-	-	-	-	-	-	-	-	-	-
Seasonal Movement Pattern										
Day/Night Movement Pattern										
Dispersal Practices										
Attack Alert Systems										
LOC Repair/Maintenance System										
Fixed Target Complex Data	-	-	-	-	-	-	-	-	-	-
Troop Housing/Shelter	-	-	-	-	-	-	-	-	-	-
Location (Center of Tgt)										
Capacity										
Status (Occupied/Unoccupied)										
Hardening										
POL Storages/Dumps	-	-	-	-	-	-	-	-	-	-
Location (Center of Tgt)										
Capacity										
Status (Filled/Unfilled)										
Hardening										
Ammo Storages/Dumps	-	-	-	-	-	-	-	-	-	-
Location (Center of Tgt)										
Capacity										
Status										
Hardening										
Truck Parks	-	-	-	-	-	-	-	-	-	-
Location (Center of Target)										
Capacity										
Status (Occupied/Unoccupied)										
Hardening										
Food Storages	-	-	-	-	-	-	-	-	-	-
Location (Center of Tgt)										
Capacity										
Type Supplies										
Status										
Hardening										
Communication Facils.	-	-	-	-	-	-	-	-	-	-
Type										
Location (Center of Tgt)										
Hardening										
Moving Target Data	-	-	-	-	-	-	-	-	-	-
Type of Mover										
Number of Movers										
Stationary or Moving										
Rate of Movement										
Direction of Movement										

Target Systems	Priority									
Data Needs	1	2	3	4	5	6	7	8	9	10
Target Vulnerability Data	-	-	-	-	-	-	-	-	-	-
Active Defenses (SAM, AAA, Radar)	-	-	-	-	-	-	-	-	-	-
Types										
Numbers										
Locations										
Passive Defenses (Bunkers, Camouflage, etc.)	-	-	-	-	-	-	-	-	-	-
Types										
Locations										
Strike Approach Terrain										
Weather and Visibility										
Target Damage Assessment Data	-	-	-	-	-	-	-	-	-	-
Number Previous Strikes										
Dates Previous Strikes										
Number Previous Strike Ordnance										
Types/Quantities Strike Ordnance										
Pilot Observed Damage										
Photo Interpreted Damage										
Other Reported Damage										
Target Degradation Estimate										
Target Recovery Capability Estimate										

B. Tactical Intelligence Adequacy

1. Recognizing that tactical air strikes are not always initiated with the benefit of completely accurate intelligence on the enemy target including the capabilities of target defenses, but taking into account your knowledge of the results of the operations which you planned and/or executed, please rate the following data needs with respect to the adequacy of the intelligence available to you for the performance of your mission.

	Intelligence was Adequate:			
Target Systems Data	Almost Always >75% of time	Often <75% >50%	Rarely <50% >25%	Almost Never <25%
Enemy Rear Services	-	-	-	-
Command Organization				
Unit Hq. Locations				
Unit Strengths				
LOCs	-	-	-	-
Alignments				
Capacities (ST/D #Men/D)				
Choke Point Locations				
Choke Point Descriptions				

Target Systems Data	Intelligence was Adequate: Almost Always >75% of time	Often <75% >50%	Rarely <50% >25%	Almost Never <25%
Enemy Tactics	-	-	-	-
Seasonal Movement Pattern				
Day/Night Movement Pattern				
Dispersal Practices				
Attack Alert Systems				
LOC Repair/Maintenance Systems				
Fixed Target Complex Data	-	-	-	-
Troop Housing/Shelter	-	-	-	-
Location (Center of Tgt)				
Capacity				
Status (Occupied/Unoccupied)				
Hardening				
POL Storages/Dumps	-	-	-	-
Location (Center of Tgt)				
Capacity				
Status (Filled/Unfilled)				
Hardening				
Ammo Storages/Dumps	-	-	-	-
Location (Center of Tgt)				
Capacity				
Status				
Hardening				
Truck Parks	-	-	-	-
Location (Center of Target)				
Capacity				
Status (Occupied/Unoccupied)				
Hardening				
Food Storages	-	-	-	-
Location (Center of Tgt)				
Capacity				
Type Supplies				
Status				
Hardening				
Communications Facils.	-	-	-	-
Type				
Location (Center of Tgt)				
Hardening				
Moving Target Data	-	-	-	-
Type of Mover				
Number of Movers				
Stationary or Moving				
Rate of Movement				
Direction of Movement				
Target Vulnerability Data	-	-	-	-
Active Defenses (SAM, AAA, Radar)	-	-	-	-
Types				
Numbers				
Locations				
Passive Defenses (Bunkers, Camouflage, etc.)	-	-	-	-
Types				
Locations				

Target Systems Data	Intelligence was Adequate:			
	Almost Always >75% of time	Often <75% >50%	Rarely <50% >25%	Almost Never <25%
Strike Approach Terrain				
Weather and Visibility				
Target Damage Assessment Data	-	-	-	-
Number Previous Strikes				
Dates Previous Strikes				
Number Previous Strike Ordnance				
Types/Quantities Strike Ordnance				
Pilot Observed Damage				
Photo Interpreted Damage				
Other Reported Damage				
Target Degradation Estimate				
Target Recovery Capability Estimate				

2. In your opinion, what are the minimum requirements for accuracy in target location data to ensure a high probability of successful delivery of air munitions against the following types of targets:

Target Type	Location Accuracy Required
Troop Bivouacs	
Command/Control Sites	
Communications Sites	
Wheeled/Tracked Vehicles	
Vehicle Parks	
Bridges	
POL Storages	
Weapons/Ammo Storages	
Food Storages	
Power Plants	
Radars	
SAM Launchers	
AAA Weapons	

C. Tactical Intelligence Collection Means

1. It has been alleged that tactical intelligence collection in Southeast Asia ranked toward the lower end of a scale of adequacy for combat operations planning and execution. Do you agree or disagree with this allegation?

_______ Agree _______ Disagree

2. Some of the different means employed to collect tactical intelligence in Southeast Asia during the period of U.S. involvement in combat operations are listed below. Please rate them in usefulness to you in your command assignments with respect to the planning and conduct of combat operations.

NOTE: Disregard whether you acquired the intelligence by direct read-out from the source, via another headquarters, or by some other means (command briefing, e.g.). Command intelligence, situation and operations reports usually identify the means by which the intelligence was originally acquired. Our interest is in the usefulness of those original means to you.

	Intelligence Was Useful:					
Collection Means	Almost Always	Often	Rarely	Almost Never	No Access	Available* But Not Used
HUMINT	-	-	-	-	-	-
Patrols	-	-	-	-	-	-
MACSOG						
Roadwatch/Riverwatch						
Lao Units						
Other Friendly Patrols						
Reports	-	-	-	-	-	-
Agents						
RLG/GVN Channels						
BDA						
Interrogations	-	-	-	-	-	-
Prisoners (IPW)						
Rallier (Chieu Avi)						

*REMARKS: (Explain, for each item checked, why not used)____________________

Collection Means	Intelligence Was Useful: Almost Always	Often	Rarely	Almost Never	No Access	Available* But Not Used
SIGINT	-	-	-	-	-	-
COMINT						
D/F						
ELINT						
SENSOR SYSTEMS	-	-	-	-	-	-
Ground	-	-	-	-	-	-
Unattended Ground Sensors (UGS)						
Ground Surveillance Radars						
Image Intensifiers	-	-	-	-	-	-
LLTV						
Starlite Scope						
NOD (Active/Passive)						
Airborne	-	-	-	-	-	-
SLAR						
IR						
Black/White Photo						
Sniffer (APDS)						
FAC						
Other Visual						
INTELL DATA BASE	-	-	-	-	-	-
Manual						
Automated						
ABCCC						

*REMARKS: (Explain, for each item checked, why not used)____________________

3. Of the collection means which you checked in the preceding questions as being <u>Rarely</u> or <u>Almost Never</u> useful to you, please list them below in one or more column headings descriptive of the principal reason or reasons for this lack of usefulness.

Unreliable	Untimely	Insufficient Detail	Other

V. TACTICAL INTELLIGENCE EVALUATION

We are interested in determining how commanders evaluate and use tactical intelligence in deciding where and how to maneuver their forces against the enemy. Many factors enter into the evaluation and decision process. Some of these factors concern the intelligence itself and others concern the availability of forces with which to respond, the value of the target presented, the time required to maneuver into position to engage the enemy, weather, time of day, terrain, other priority mission assignments, etc. The following questions are intended to allow for the interaction of all these variables in the decision-making process but are nevertheless specifically pointed toward the evaluation and use of tactical intelligence within that total process.

A. In your command assignments, did you respond immediately and directly to tactical intelligence reports concerning your TAOI:

(Check only one)

1. Almost always _____
2. Very often _____
3. Sometimes but not very often _____
4. Never _____

B. Was your decision most often based on:

(Choose only one)

1. Source reliability _____
2. Information credibility _____
3. How the intelligence fit or formed a pattern _____
4. The intelligence confirmed other reports _____
5. The intelligence did not fit a pattern _____
6. Other reasons _____

C. If you most often based your decisions on other reasons, please explain what they were.

Reason(s): ____

____

____

____

D. To what extent were your evaluations of tactical intelligence hampered or delayed by language and cultural barriers:

1. Almost always _____
2. Very often _____
3. Sometimes but not very often _____
4. Never _____

E. To the extent that language and cultural barriers may have posed problems to you in the collection and evaluation of tactical intelligence, can you suggest within limits of practicability how they might be successfully overcome?

Suggestions: ____

____

____

____

____

F. It has been suggested that ways must be found to shorten the time required to collect, process, analyze, produce, and disseminate tactical intelligence in response to the requirements of operations planners.

Do you agree or disagree with this suggestion?

_____Agree _____Disagree

G. If you agree with the suggestion in question F above, which factors do you think should be manipulated to achieve the desired results? (check all that apply)

Collection _____
Processing _____
Analysis _____
Production _____
Dissemination _____

H. For items checked in question G, would you recommend:

1. More intelligence collection personnel? _____
2. About the same number of intelligence collection personnel but improved training in intelligence collection methods? _____

3. More automation of intelligence processing and analysis? _____

4. About the same amount of automation but improved organizational procedures to shorten processing and analytical time? _____

5. Better trained personnel to process and analyze collected data? _____

6. More professionally trained personnel to process and analyze collected data? _____

7. Less-stringent security controls to enable all intelligence analysts at all levels to have the benefit of all-source intelligence inputs? _____

8. Retain stringent security controls but integrate all-source intelligence collection, processing and analysis at one or more echelons below theater command? _____

9. To which echelons would you recommend assigning control of collection means most useful in acquiring intelligence on enemy order of battle activities in remote border and cross-border areas?

Collection Means	Echelon of Control
Special Operations Patrols	_____
Special Agents	_____
SIGINT Assets	_____
Strategic Reconnaissance Aircraft	_____
Tactical Reconnaissance Aircraft	_____
Unattended Ground Sensors	_____

10. Speed the dissemination process through a dedicated communications channel for intelligence reporting and dissemination? _____

I. In what other ways do you think the tactical intelligence evaluation process could be improved to better serve the needs of operations planners.

J. One of the unresolved problems in Southeast Asia was the timely assessment of damage inflicted on the enemy by air strikes(and artillery fire)into densely jungled terrain. In order to obtain more accurate and more timely assessments of such damage would you recommend:

1. Immediate follow-up on the ground by reconnaissance teams? _____

2. Research and development of advanced, foliage-penetrating image-making aerial observation devices. _____

3. Research and development of advanced unattended ground devices with visual scanning capabilities (e.g., robot devices)? _____

4. Some other means? (Please specify) _____

GLOSSARY

GLOSSARY

AA	Antiaircraft
AAA	Antiaircraft Artillery
AAOB	Antiaircraft Order of Battle
AAR	After Action Report
ABCCC	Airborne Battlefield Command and Control Center
Abn	Airborne
A/C	Aircraft
ACC	Area Coordination Center
Acft	Aircraft
ACOUSID	Acoustic Intrusion Detector
ACR	Armored Cavalry Regiment
ADF	See ARDF
ADP	Automatic Data Processing
ADSID	Air Delivered Seismic Intrusion Detector
AMPD	Airborne Manpacked Personnel Detector
AO	Area of Operations
APB	Self-propelled Barracks Ship
APD	Airborne Personnel Detector
APDS	Airborne Personnel Detection System
APL	Barracks Ship (non-self-propelled)
ARDF	Airborne Radio Direction Finding
ARPA	Advanced Research Projects Agency
ARS	Air Reconnaissance Support
Arty	Artillery
ARVN	Army of the Republic of Vietnam

ASA	Army Security Agency
ATC	Armored Troop Carrier
BDA	Bomb Damage Assessment
Bde	Brigade
Bn	Battalion
C^3	Command, Control and Communications
C&C	Command and Control
CDCEC	Combat Developments Command Experimentation Center
CDEC	Combined Documents Exploitation Center
CEP	Circular Error Probable
CG	Commanding General
CH	Commando Hunt
CHECO	Contemporary Historical Evaluation of Combat Operations (USAF)
CHICOM	Chinese Communist
CICV	Combined Intelligence Center, Vietnam
CIDG	Civilian Irregular Defense Group
CINCPAC	Commander in Chief, Pacific
CIS	Combined Intelligence Staff
CMA	Collection Management Authority
CMAC	Capitol Military Assistance Command
CMEC	Combined Materiel Exploitation Center
CMIC	Combined Military Interrogation Center
CNFCS	Cobra Night Fire Control System
COC	Combat Operations Center
COMINT	Communications Intelligence
COMMO	Communications
COMNAV-FORV	Commander (US) Naval Forces Vietnam
COMUS-MACV	Commander, US Military Assistance Command, Vietnam
CONTIC	Continental Army Command Intelligence Center
CONUS	Continental United States
COSVN	Central Office of South Vietnam
CRIP	Combined Reconnaissance and Intelligence Platoon
CRT	Cathode Ray Tube
CSR	Camp Sentinel Radar

CSW	Crew-Served Weapon(s)
CSWS	Crew-Served Weapon Sight
CTZ	Corps Tactical Zone
DCPG	Defense Communications Planning Group
DF	Direction Finding
DIOCC	District Intelligence Operations Coordination Center
DIRID	Directional IR Intrusion Detector
DISCOID	Direct Scan Operating with Integrating Delay
Div	Division
DMPI	Desired Mean Point of Impact
DMZ	Demilitarized Zone
DOD	Department of Defense
DSU	Direct Support Unit
DZ	Drop Zone
ECM	Electronic Countermeasure
ELINT	Electronic Intelligence
EMID	Electromagnetic Intrusion Detector
EW	Electronic Warfare
FFORCEV	(I FFORCEV, II FFORCEV), First and Second Field Forces Vietnam
FAC	Forward Air Controller
FEBA	Forward Edge of Battle Area
FIRTI	Far Infrared Target Indicator
FLIR	Forward-Looking Infrared
FOPEN	Foliage Penetrating
FSB	Fire Support Base
FWMAF	Free World Military Assistance Forces
Gp	Group
Grd	Ground
GST	Ground Sensor Terminal
GVN	Government of Vietnam
HANDSID	Hand-emplaced Seismic Intrusion Detector
HF	High Frequency
HQ	Headquarters
HUMINT	Human Intelligence
ICAP	Intelligence Civic Action Patrol

ID	Identification
IDA	Institute for Defense Analyses
IIR	Intelligence Information Report
Inf	Infantry
INFANT	Iroquois Night Fighter and Night Tracker
IPW	Interrogation, Prisoner of War
IR	Infrared
ISC	Infiltration Surveillance Center
JCOC	Joint Combat Operations Center
KBA	Killed by Air
KIA	Killed in Action
LLLTV	Low Light Level Television
LOC	Line(s) of Communication
LORAN	Long-Range Navigation
LRRP	Long-Range Reconnaissance Patrol
LST	Landing Ship, Tank
Lt	Light
LZ	Landing Zone
MACSOG	Military Assistance Command Studies and Observation Group
MACV	Military Assistance Command, Vietnam
MAF	(III MAF), Third Marine Amphibious Force
MAGID	Magnetic Intrusion Detector
Mech	Mechanized
MEDCAP	Medical Civic Action Patrol
MF	Main Force(s)
MI	Military Intelligence
MICAT	Mobile Intelligence Civil Affairs Team
MPD	Manpacked Personnel Detector
MR	Military Region (formerly CTZ)
MRDF	Medium-Range Direction Finding
MRF	Mobile Riverine Force
MSS	Military Security Service (Vietnamese)
MTI	Moving Target Indicator
NKP	Nakhon Phanom
NM	Nautical Mile(s)

NOD	Night Observation Device
NVA	North Vietnamese Army
NVASS	Night Vision Aerial Surveillance System
NVN	North Vietnam
OB	Order of Battle
OPCON	Operational Control
OPS	Operations
ORLL	Operations Report Lessons Learned
PACOM	Pacific Command
PF	Popular Forces
PIOCC	Province Intelligence Operations Coordination Center
PIRID	Passive IR Intrusion Detector
Plt	Platoon
POI	Program of Instruction
POW	Prisoner of War
PRU	Provincial Reconnaissance Unit
PSID	Patrol Seismic Intrusion Detector
PSYOP	Psychological Operations
PW	Prisoner of War
QRF	Quick Reaction Force
RAC	Research Analysis Corporation
RD	Revolutionary Development
RDF	Radio Direction Finding
Recce	Reconnaissance
RECONDO	Reconnaissance Doughboy
Reconn	Reconnaissance
Regt	Regiment
RF	Regional Forces
RF/PF	Regional Forces/Popular Forces
RLAF	Royal Laotian Air Force
RLG	Royal Laotian Government
ROE	Rules of Engagement
RPM	Revolutions per Minute
RRU	Radio Research Unit
RTAF	Royal Thai Air Force

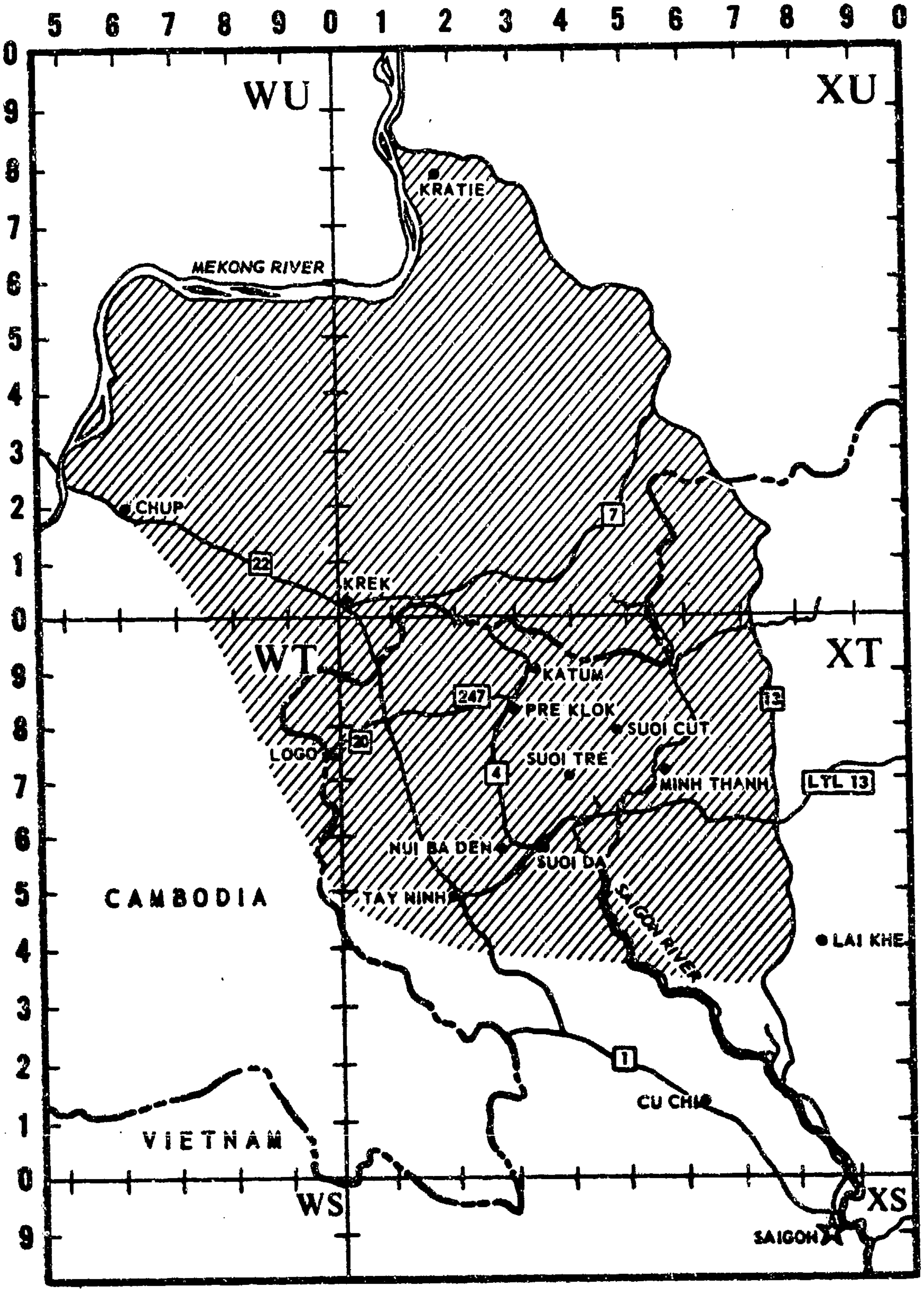
RTAFB	Royal Thai Air Force Base
RTG	Royal Thai Government
RVN	Republic of Vietnam
RVNAF	Republic of Vietnam Armed Forces
SAC	Surveillance Aircraft Company
SAM	Surface-to-Air Missile
Sep	Separate
SI	See SIGINT
SID	Seismic Intrusion Detector
SIGINT	Signal Intelligence
SLAR	Side-Looking Airborne Radar
SMP	Special Munitions Package
SOG	See MACSOG
SOW	Special Operations Wing
Sqd	Squad
SRDF	Short-Range Direction Finding
SS	Starlight Scope
ST/D	Short Tons per Day
SVN	South Vietnam
TAC	Tactical Air Command
TACC	Tactical Air Control Center
TAOI	Tactical Area of Operational Interest
TAOR	Tactical Area of Operational Responsibility
TFA	Task Force Alpha
TFW	Tactical Fighter Wing
TOC	Tactical Operations Center
TRS	Tactical Reconnaissance Squadron
TRW	Tactical Reconnaissance Wing
UGS	Unattended Ground Sensor
UHF	Ultra High Frequency
USAF	United States Air Force
USAINTS	US Army Intelligence School
USARV	US Army Vietnam
USASA	US Army Security Agency
USASF	US Army Special Forces

USN	United States Navy
VC	Viet Cong
VCI	Viet Cong Infrastructure
VHF	Very High Frequency
VNAF	Vietnamese Air Force
VNMC	Vietnamese Marine Corps
VNN	Vietnamese Navy
VNSF	Vietnamese Special Forces
WIA	Wounded in Action

Operations Against Enemy Main Forces:

The War Zone C Experience (U)

CONTENTS



Vietnam: War Zone C

1. INTRODUCTION

(S) Throughout all the years of fighting in Indochina since World War II, the communists have based their principal maneuver forces in remote, sparsely-populated jungle areas along the poorly demarcated and mostly uncontrolled borders which French colonial administrators had delineated on their maps as the territorial limits of the traditional homelands of the Lao, Cambodian and Vietnamese peoples. From 1946 to 1954, the French military forces which sought to defeat the communist insurgents were unconstrained by these map boundaries but the French lacked the resources required to move into the base areas in force and clear them permanently of the enemy presence. Insofar as the territory south of the seventeenth parallel was concerned at the time of the 1954 Armistice (the Geneva Accords of 1954), French intelligence maps depicting the Viet Minh order of battle showed War Zones C and D, the Iron Triangle and U Minh Forest areas, among others, as zones containing enemy bases and subject to enemy domination and control.[1] War Zone C, moreover, was clearly indicated to encompass the mixed jungle, scrub and rubber plantation area on both sides of the South Vietnam-Cambodian border from Tay Ninh northwest to Prek and Chup in Cambodia, thence north and east along the Mekong to Kratie and thence southeast along the axis of Route 13 to the vicinity of Ben Cat. The history of Viet Minh domination of this area dated from the end of World War II, and the lines of communication between it and Hanoi were known to lead through Laos.[1]

(C) From 1954 onward, the communists never relinquished their hold on the areas which they had come to dominate in the war against the French. War Zone C, especially, in northern Tay Ninh province along the Cambodian border remained a primary haven and base for communist subversive operations against the Diem government. As a terminal point for the Ho Chi Minh trail system it became in time the principal base and staging area for insurgent activities directed against the heavily-populated districts to the northwest of Saigon, and eventually became the headquarters area for the Central Office of South Vietnam (COSVN) which commanded and controlled all political-military activities by the communists against the South Vietnamese government.

2. EARLY PENETRATION

(U) In late 1966, COMUSMACV decided that sufficient resources were available for a major push into War Zone C to clear the area of enemy forces and to destroy the bases from which they operated. A number of smaller, reconnaissance-in-force operations around the edges of War Zone C in late 1966, among them Operations Attleboro, Gadsden and Tucson, had confirmed the feasibility of a major assault into the heart of the enemy's War Zone. None of the earlier operations were intended to penetrate deeply into War Zone C but only to establish bases of operations from which to maintain pressure on and to interdict enemy movement through and from the War Zone toward Saigon and its environs.

2.1 Operation Attleboro

(U) This was a two-month search and destroy operation around the southern and eastern edges of War Zone C. The operation commenced on 14 September 1966 and ended on 24 November 1966. Participating US forces included elements of the 196th Inf. Bde. (Sep)(Lt); the 3d Bde, 1st Inf. Div.; the 3d Bde, 4th Inf. Div.; and the 173d Abn Bde (Sep). The primary maneuver units committed to the operation throughout the period, however, were from the 196th Inf. Bde which had arrived in-country on 15 August and had deployed to the vicinity of Tay Ninh under sponsorship of the 25th Inf. Div. at Cu Chi.

(U) Attleboro did not achieve a large number of enemy kills (254 confirmed) but did overrun a number of enemy camps and fortified positions containing both above ground and underground structures. Over 800 tons of rice, together with much rice processing equipment, a variety of enemy documents and some small arms and ammunition were captured in the course of the operation.[2,3,4]

2.2 Operation Gadsden

(C) Another predecessor to the first major penetration of War Zone C was Operation Gadsden from 2-21 February 1967. Gadsden was initiated by the 25th Inf. Div. and employed the 3d Bde, 4th Inf. Div., and 196th Inf. Bde (Lt)(Sep) to search out and destroy enemy forces and base camps along the Cambodian border to the west and north of Tay Ninh city. Although the operation spanned 20 calendar days a nominal four-day Tet truce was observed from 8-12 February in the middle of the operation. On 8 February, US forces received small arms and rifle grenade fire from across the Cambodian border in the vicinity of WT 967715. Fire was returned.

(C) As in the case of Operation Attleboro, Gadsden achieved only light, sporadic contact with enemy forces. Only 165 confirmed enemy kills and 21 detainees were tallied.[5] However, numerous enemy base installations were uncovered, overrun and destroyed, and significant quantities of supplies and documents were seized. Captured equipment included 26 individual and one crew-served weapons, six field radio sets (three CHICOM and three US including one AN/PRC-25), 24 CHICOM field telephones, 386 tons of rice, 8 tons of salt, 558 pounds of documents, and a substantial quantity of medical supplies.[5] One of the installations discovered and destroyed in the vicinity of WT 986624 (to the south of Lo Go and adjacent to the Cambodian border) was an ordnance facility and training base containing bombs, artillery rounds and grenades as well as tools and molds for their fabrication.[6]

2.3 Operation Tucson

(U) Operation Tucson was initiated on 14 February 1967 by the 1st Inf. Div. as an eight-day deception prior to the launching of Junction City on 22 February. The Tucson area of operation embraced the south eastern edge of War Zone C as well as the northern sector of the Long Nguyen Secret Zone and Michelin rubber plantation. Enemy communications-liaison routes were known to transit this area in both east-west and north-south directions, connecting War Zones C and D, and also serving the

"Northern Rice Route" to Saigon. On 18 February the 1st Division Forward CP displaced from Lai Khe to Minh Thanh in order to assure adequate command and control of the divisional elements which were to be committed to Junction City.

(C) As in the cases of the other operations around the fringes of War Zone C prior to Junction City, Tucson did not produce many enemy kills. Also like the others, however, it uncovered numerous camps and storage areas. Enemy food supplies were especially hard hit by the 1400-1700 tons of rice which were captured by the US forces.[4,5]

3. JUNCTION CITY: February-May 1967

(U) Operations Gadsden and Tucson ended on 21 February with the 3d Bde, 4th Inf. Div. in blocking positions along the Cambodian border to the west and northwest of Tay Ninh City, the 196th Inf. Bde (Sep)(Lt) in positions around Tay Ninh City, the 2d Bde, 25th Inf. Div. in and around the Division's base at Cu Chi, and the 1st Bde, 1st Inf. Div. in forward positions around Minh Thanh. These dispositions accomplished the essential maneuvers preliminary to the launching of Junction City on the following day.

3.1 Concept of the Operation

(U) In broad perspective, Junction City was intended to clear War Zone C of all enemy forces and installations with a primary objective being the discovery and destruction of the Headquarters, Central Office South Vietnam (COSVN). The operation commenced with a combined airborne and airmobile assault by elements of the 173d Airborne Brigade and 1st Bde, 1st Infantry Division into positions to the north of Katum, along the tracks of highways TL-4 and 246. Their purpose was to block enemy movement from War Zone C northward into Cambodia or eastward into War Zone D. In combination with this move, the 2d Bde, 25th Infantry Division and the 11th Armored Cavalry Regt pushed northward along highway TL-4 from the vicinity of Nui Ba Den to effect a linkup with the airborne assault forces. On D+2, two battalions of Vietnamese marines (Task Force Alpha) from the General Reserve of the RVNAF were airlifted into positions along the Cambodian border to the northwest of Tay Ninh City. This task force, along with the 196th Light Infantry Bde and the 3d Bde, 4th Inf. Div. were operationally controlled by the 25th Inf. Div. Together these elements blocked the principal lines of escape from War Zone C to the west into Cambodia. With the major routes of escape blocked, enemy forces within War Zone C were faced with the choices of (1) standing and fighting; (2) exfiltrating the area by numerous secondary routes which offered good possibilities for maneuver between the US and Vietnamese forces; or (3) maneuvering within the recesses of War Zone C to avoid contact with the allied forces except at places and times of the enemy's choosing.

3.2 Intelligence Estimate

(C) Junction City was based on sound intelligence concerning the importance of War Zone C to the enemy as a base area housing substantial numbers of Main Force maneuver units and Rear Services support elements. The locations and strengths of the enemy units were not, however, known to the degree of precision required to ensure that US and Vietnamese forces would be able to fix and destroy them, nor were the locations of the enemy's main operating bases and control headquarters known to a degree of precision that would guarantee their discovery and destruction by the searching friendly forces.

(C) With respect to enemy unit locations and strengths, MAC-V, and IIFF intelligence in late 1966 held the 70th Guards Regiment to be in an area close to the Cambodian border and somewhat to the east of route QL-22 which leads northwest from Tay Ninh and connects with a main east-west highway (Route 7) in Cambodia. The U80 Artillery Regiment in late 1966 was believed to be to the southeast of the 70th Guards positions. The 101st Regiment was suspected to be in position east of Katum but its identification was unconfirmed. COSVN was believed to be located near the Cambodian border between the 70th and 101st Regiments. Other enemy forces in Tay Ninh province but not within the heartland sector of War Zone C included the 271st and 273d Regiments of the 9th Division. These elements together with their controlling divisional headquarters were believed located to the east of Tay Ninh City in and around the Michelin plantation.[7]

(C) Despite the successes of Operations Attleboro, Gadsden, and Tucson in uncovering numerous hidden base camps, training areas, storages and other facilities, they had not succeeded in engaging enemy Main Forces in significant strength. Hence, in late January and early February 1967 when Junction City was being planned and staged, the intelligence picture was not much brighter than it was three months earlier. Indeed, available intelligence for Phase I of Junction City could be termed fragmentary with respect to Main Force unit locations. The 70th Guards Regiment was believed to have moved southeast from its earlier location to positions between the junction of Routes TL-4 and 247 and the Prek Klok river to the east (vic coordinates XT 2972 and XT 2875). Elements of the 271st Regiment had moved northwest from earlier positions to an area north of Lo Go near the Cambodian border (WT 9580). The whereabouts of the U80 Artillery Regiment were unknown.[8] COSVN was still believed to be in the area west of Katum near the Cambodian border and the 101st Regiment was still suspected to be somewhere in the northeastern part of Tay Ninh province. It was also believed to be below strength with about 10% sick with malaria and other diseases. The Headquarters of the 9th Division was still believed to be in the same area as before, i.e., somewhere to the north and east of the Michelin plantation. Battalions of the 272d Regiment, which was known to operate in nearby Binh Long Province as well as in Tay Ninh, together with elements of the Tay Ninh Mobile Force (D-14 [Local Force] Bn) and Phu Loi Battalion were presumed available for reinforcement of enemy units under pressure.[9,10]

(C) Lack of Intelligence Coordination. A review of the reports prepared by the various units which participated in Junction City indicates that the fragmentary information available on enemy unit locations was supplemented to some extent from their own resources. The 3d Bde, 4th Division, for example, exploited intelligence available at 25th Div. (to which the Brigade was OPCON) and also visited the neighboring 196th Bde MI Detachment and Special Forces camps in an effort to develop more information.[8] Reports of the 1st Inf. Div. and 173d Abn Bde indicate that they followed a similar practice.

(C) It must be observed that the available After Action and Operational Reports as well as the intelligence annexes to the Operational Orders for Junction City do not show that participating US units all possessed the same intelligence in-depth for the probable locations and strengths of enemy units within War Zone C. This situation is understandable after-the-fact because MAC-V and II Field Force directives concerning the establishment and functions of Province and District

Intelligence and Operations Coordination Centers (PIOCC and DIOCC) were just being implemented when Junction City was being planned. A primary objective of the new PIOCCs and DIOCCs was to promote liaison and cooperation between US/FWMAF Units (division through battalion) and advisors to corresponding ARVN/GVN organizations. The new PIOCCs and DIOCCs were places where, with some exceptions, intelligence from all GVN and US/FWMAF sources would be processed, analyzed and disseminated.

(U) The principal GVN contributions to this process were Provincial Reconnaissance Units, Police Special Branch, Census Grievance Teams, Revolutionary Development Cadres, Military Intelligence Service, ARVN Units, Regional Forces, Popular Forces, and Civilian Irregular Defense Groups. All of these organizations had attached US advisory personnel whose duties included facilitating the flow and exchange of intelligence between US tactical units and GVN elements. Because the PIOCC/DIOCC system was only in process of being implemented, there were obvious limitations to its capability to provide up-to-date assessments to the Junction City forces in advance. Coupled with this limitation was the equally obvious fact that the US maneuver elements at that time had, at best, an imperfect knowledge of the kinds and importance of tactical intelligence shared by US and GVN personnel at province and district levels.

(C) Security Restrictions. In Junction City as in many other operations against enemy Main Forces throughout the war, security restrictions played an important role in the dissemination of tactical intelligence to US maneuver units. This was particularly true of intelligence acquired through MACSOG operations and SIGINT channels. At the level of classification appropriate to this section all that can be said of this problem is that Junction City was immediately preceded by a number of high altitude, heavy bombing raids on suspected enemy base installations within War Zone C. It must be considered unlikely that these raids were planned and executed in the absence of confirmed intelligence concerning the locations, importance, dimensions, and other characteristics of the targets which were struck. It is factually evident, however, from official reports and from interviews conducted in support of this study, that this intelligence was not available to US maneuver unit commanders either before or during Junction City, or in numerous other Main Force operations in other parts of Vietnam in later years. Insofar as the units on the ground were concerned, their mission was to search for, discover and destroy enemy forces and bases within a general area of operations. They seldom, if ever, received intelligence concerning the coordinate locations and size of the installations for which they were searching. Yet such intelligence was obviously available for the targetting of heavy bombing raids.

3.3 Adequacy of Tactical Intelligence in Relation to Needs of Maneuver Units

(C) Of the former unit commanders and staff planners interviewed in support of this study, many had direct experience in operations against enemy Main Forces in War Zone C and especially in Junction City. Others had similar experience in the remote border areas of MRs I and II with respect to seeking out and destroying the enemy. These interviews show a clear concensus on the primary needs of battalion and brigade commanders for intelligence on enemy unit locations, strengths and compositions. The interviews also show a concensus that intelligence was rarely or almost never available in adequate detail for the planning and conduct of Main Force operations. There is, moreover, almost universal agreement among former commanders that tactical intelligence collection ranked toward the lower end of a scale of adequacy for combat operations planning and execution. With these thoughts in mind it is instructive to compare the results of Junction City with the intelligence available to the US combat units on the ground at the time.

(C) Junction City Phase I Results. Phase I of Junction City ran for approximately three weeks from 22 February through 17 March 1967. During this time there were few contacts with significant numbers of enemy forces. In proportion to the numbers of US and GVN forces committed to seeking out the enemy, the operation was only marginally productive. Results through the end of February totaled only 271 enemy killed, 69 individual weapons, and 8 crew-served weapons captured, and 290 pounds of documents seized.[5] Somewhat better results were encountered in the discovery of enemy base camps. Twenty-eight of these were found and razed, and 292 tons of rice were either captured or destroyed in the process.[5] The 3d Bde, 4th Division (OPCON to the 25th Division) uncovered little in the way of troops and stores along the Cambodian border west and north of Tay Ninh.[8,11] The most significant contact occurred on 26 February in the vicinity of XT 046830, northeast of Lo Go when B/2/12 was guided to a base camp by an aerial observer and was engaged by an estimated enemy battalion. After reinforcement and the delivery of close artillery fire, B/2/12 overcame the enemy's resistance and took the position. Only 11 enemy kills were confirmed but documents retrieved from the enemy dead positively identified the unit as the 3d Bn, 271st Regt.[8]

(U) To the north of the 3d Bde, 4th Div., the Vietnamese marines (Task Force Alpha) swept through their area of operations without major contact. The 25th Division and 11th ACR elements which pushed up Route TL-4 to Katum also failed to achieve significant contact. The 1st Division and units under its operational control had somewhat more success. On 28 February the 1/16 Inf. of the 3d Bde engaged a battalion-size enemy force which was later identified as the 101st NVA Regiment. The action occurred near XT 2872, to the east of Route TL-4, and south of the CIDG camp which was under construction at Prek Klok (XT 2778). Airstrikes and artillery were directed against the enemy and the 1/16th was reinforced by the 2/18th. The enemy broke contact leaving 167 dead on the field.[4] With respect to the adequacy of the tactical intelligence supporting Junction City, it must be observed that although the presence of the 101st Regiment in War Zone C was suspected, it's location as of 22 February, one week before this engagement, was thought to be 20 km further north in the vicinity of Katum where the 173d Abn Bde had made a combined parachute and airmobile assault on D-Day.

(U) The enemy's concern with the construction of the CIDG camp at Prek Klok is obvious in retrospect. This camp was sited to screen and block enemy infiltration from Cambodia and War Zone C eastward into War Zone D and southward via the Saigon River toward Saigon. On 10 March, elements of the 272d Regiment which had been placed in Binh Long Province when Junction City was launched, but which was also considered available to reinforce enemy units in War Zone C, attacked the 2/2 Inf. which was securing FSBII in support of the Prek Klok CIDG Camp. It was a multi-battalion night attack from the south and east. The enemy broke contact at 0500 leaving behind 196 killed and five prisoners.[4] Assuming the accuracy of the intelligence estimate on 22 February, the 272d Regiment had indeed moved west to reinforce in War Zone C. Available documentation does not, however, show that this movement was either detected or, if detected, was made known to the friendly forces at Prek Klok.

(U) In the northernmost part of War Zone C within the TAOR of the 173d Abn Bde the US forces encountered only small groups of enemy in the first phase of Junction City. Numerous base camps were, however, discovered and destroyed and most contacts appeared to be with enemy troops whose mission was to conduct a harassing defense of the camps. Exceptions to this general rule occurred on 3 March when 2/503d moving south from Katum to the east of highway TL-4 was attacked by an estimated battalion-size element of the 70th Guards Regiment. Although the enemy suffered 39 killed, friendly losses were 20 killed and 28 wounded, and the 2/503d left the field without recovering three of their own dead. The bodies were not recovered until later in the day when the enemy had withdrawn.[9]

(U) On 11 March the 1/503d encountered what a prisoner later revealed as the H3 Battalion, 16th Regiment, 9th NVA Division. The engagement occurred during daylight hours in the vicinity of XT 3879, to the east of Prek Klok and northeast of Suoi Da. Again in retrospect it appears that the 9th NVA Division moved west from its earlier known locations in an attempt to drive friendly forces from Prek Klok and keep open the enemy's routes of communication. The enemy suffered 29 killed in this action. Friendly losses were 12 wounded.

(U) Junction City Phase II Results. The contacts generated in the first phase of Junction City (22 February - 16 March) as well as other intelligence acquired from prisoner interrogations, captured documents, photo-interpretation and visual aerial reconnaissance prompted a reduction of effort for Phase II of Junction City. There were some indications that significant elements subordinate to COSVN had been "trapped" west of highway TL-4 and that, as already shown, several Main Force units had moved into the area from the east in an attempt to relieve the pressure. In order to increase the pressure on the center of War Zone C, the 3d Bde, 4th Infantry Division and 196th Bde, under operational control of the 25th Division, were redeployed from their Cambodian border positions to the eastern part of War Zone C. Their new positions were to the northeast of Nui Ba Den, along the axis of highways LTL 13, 244 and TL-4. The 2d Bde, 25th Division continued to push into the War Zone as before. The 1st Division with the 173d Abn Bde, 1st Bde, 9th Division, and 11th Armored Cavalry Regiment under operational control redeployed to positions along highway 13 from Lai Khe to Quan Loi. A number of ARVN battalions were associated with (in effect satellited on) the US maneuver forces. The practical effect of these redeployments was to open additional avenues of escape from the War Zone to sanctuaries across the Cambodian border.

(U) Three major engagements took place during Phase II. What is especially noteworthy from the point of view of the adequacy and accuracy of tactical intelligence is that each engagement took the form of a major enemy attack on a US position. Although the attacks were all repulsed and the enemy took very heavy losses (over 1400 dead to only 41 US) he clearly demonstrated his ability to maneuver regimental-size forces through the friendly lines and to gain position to launch assaults without being detected. On the other hand, it must also be acknowledged that the US maneuver battalions and supporting fire bases were positioned to, in effect, force the enemy's hand. That is to say that the disposition of friendly combat elements offered the enemy the choice of accepting battle in an attempt to drive the US and ARVN from his important base area, or relinquishing the area to US and ARVN control for some indefinite period. The enemy did a little of both. He successfully evaded the US forces while concentrating where he thought he might be successful, and while further maneuvering back toward the northwest and the sanctuary of Cambodian territory.

(C) Of the enemy attacks on US positions during Phase II of Junction City, the battle of Suoi Tre was both typical and instructive. On 21 March the 272d VC Regt supported by the U80 Artillery Battalion attempted to overrun FSB Gold (XT 386717) which had been established two days earlier by the 3/22 Inf. and 2/77 Arty. The attack began at about 0630 and continued until 1100 when the enemy broke contact under the combined pressure from the defenders, TAC air, fires from supporting US artillery bases and arriving relief forces. The attack was launched from the northeast, south and northwest with the major thrust from the south. The enemy achieved total surprise and succeeded in destroying much of the defenders reserves of ammunition and communications capability in his opening mortar barrage.[6,11]

(C) The defenders of FSB Gold held their ground with C/2/77th Arty firing Beehive rounds at point-blank range. The 2/22 Inf. (Mech) and 2/34th Armor (-) moved to relieve from the southwest, and the 2/12th Inf. moved to relieve from the northwest. The enemy broke contact and retreated northward under attack by airstrikes and friendly artillery. The enemy left 647 dead, 6 prisoners, and significant numbers of individual and crew-served weapons on the battlefield. US losses were 30 killed and 109 wounded.[6,11]

(S) Senior US commanders with detailed knowledge of the Battle of Suoi Tre have expressed the opinion in interviews that the enemy attack on FSB Gold could have been preempted with timely distribution of SIGINT to the defending tactical commanders. The enemy is known to have made heavy use of radio for command and control of his forces as they maneuvered into position for the attack, and there is reason to believe that this radio traffic was intercepted by friendly forces but that the intelligence gained from the intercepts was not immediately passed to the defenders. Whether this situation did in fact obtain at the time cannot be evaluated at the level of classification appropriate to this section.

(S) It must be noted, however, that the interviews of former battalion, brigade and division commanders conducted in support of this study evidence a strong trend toward the conviction that relevant SIGINT should be passed to maneuver unit commanders as it is acquired. Commanders who engaged in operations against enemy Main Forces in all areas of Vietnam (i.e., MR's I, II, III and IV) have stated that they employed a variety of means, including threats to acquire SIGINT from collection units attached to their commands. The former commanders justify their actions primarily on grounds that SIGINT and especially D/F data must be acted on while the enemy is at or near the position from which he is transmitting. In modern warfare it must be expected that the enemy may change location soon after every radio transmission. He will do so to prevent discovery of his position. In the view of many interviewees, rigid security controls which act to delay dissemination of D/F and other SIGINT to tactical commanders serve only the interests of the intelligence community, not the needs of maneuver units.

(U) One other engagement during Phase II of Junction City was significant from the point of view of tactical intelligence. At 0500 on 1 April 1967, the enemy attacked elements of the US 1st Division in night positions to the southwest of LZ George (vicinity XT 428847). The attack took the standard form of a mortar barrage on the US positions (the 1/26 Inf., 1/16 Inf. and FSB Charlie at XT 565850), followed by a ground assault on the 1/26 Inf. position. The main attack was from the north and east and friendly artillery fire was directed on it. Air strikes were also placed on enemy positions to the north when cloud cover lifted at about 0700. Immediate interrogation of an enemy soldier captured during the battle revealed that the enemy's planned reassembly area and withdrawal route was to the east and northeast of the Cambodian border. Air and artillery was immediately shifted onto the reassembly area, and infantry exploitation was effected by the 1/2 Inf. and 1/16th Inf. In addition, two B-52 strikes were placed on the withdrawal route approximately three kilometers south of the Cambodian border. Enemy losses in this action were 609 killed and 3 prisoners. Friendly losses were 10 killed and 64 wounded.[4]

(C) Junction City Phase III Results. Phase III of Junction City covered the period 8 April - 20 May. The scale of operations was significantly reduced in this phase from multi-division to brigade, and toward the end of the period only the 1st Bde, 9th Infantry Division and 36th ARVN Ranger Battalion were operating in the lower half of War Zone C. There were no major engagements in this phase; contacts were very light and sporadic although the enemy continued to harass the Special Forces (CIDG) camp at Prek Klok with mortar rounds. Upon termination of the operation the enemy had lost over 2700 killed, 34 captured, 137 ralliers, 491 individual weapons and 95 crew-served weapons.[12]

4. SUBSEQUENT WAR ZONE C OPERATIONS

(C) After termination of Junction City in May 1967, US combat forces continued to penetrate War Zone C but on a much reduced scale. Chief among such follow-up operations were Yellowstone (December 1967 - February 1968) and Saratoga (December 1967 - March 1968) both of which were conducted by the 25th Infantry Division. Both, unfortunately for purposes of this study, spanned the enemy's TET 1968 offensive which required a substantial diversion of US combat resources from their planned ongoing operations to the containment and ultimate defeat of the enemy attack. Saratoga focused on the Cambodian border area to the south and southwest of Tay Ninh City, i.e., along the northern shoulder of the "Parrot's Beak" which afforded enemy units a greater measure of protection by Cambodian territory in the approach to Saigon and the delta region of South Vietnam than did the routes through War Zone C. Yellowstone was a companion piece in the northern part of Tay Ninh province. It had as specific objectives the discovery and destruction of VC/NVA forces and installations and the completion of several engineering projects including the rebuilding of several roads, the completion of work on Special Forces CIDG camps at Katum and Prek Klok, and the completion of Katum airfield.

4.1 Operation Yellowstone

(C) As previously mentioned, the planned course of Operation Yellowstone was impeded by the enemy's 1968 TET offensive. The intelligence estimates which supported Yellowstone's planning indicated a substantial build-up of enemy strength in War Zone C and adjacent areas in Cambodia. Total enemy strength was estimated at 10,000-14,000 men. Principal units were believed to include the 69th Artillery Regiment, 1st Guard Battalion, 680th Training Regiment, 7th NVA Division, 82d Rear Services Group, and possible elements of the 9th NVA Division. COSVN Headquarters and protecting guard units were believed to be located due north to Katum but other unit dispositions and locations were unknown.[13]

(C) Most of the intelligence which supported Yellowstone was gained from combat troops and aerial reconnaissance employing both visual and mechanical means. The overall evaluation of the intelligence was C-3 (sometimes reliable, possibly true).[13]

(C) Battle of Suoi Cut. One of the most significant actions during Yellowstone was an enemy attack on FSB Burt (XT 500805) near Suoi Cut, to the southeast of Katum. It was a multi-battalion, night attack by the 271st and 272d NVA Regiments which had been believed located well to the northeast of the area when Yellowstone was launched three weeks earlier. The attack was part of the TET offensive and occurred on New Year's Eve. This battle again brought the 3d Bde, 25th Division into action against the same enemy units with which it had tangled in Junction City. The enemy lost 379 killed and eight prisoners (wounded) in this engagement to only 23 US killed and 146 wounded.[13] He again demonstrated his ability, however, to maneuver substantial forces into position for, and to launch an attack against US forces without being detected.

4.2 Operation Saratoga

(C) Intelligence prior to the start of Saratoga showed that enemy units in the AO were primarily VC Local Forces, viz., the D-14, D-16, 269th, 267th and 506th Battalions, all of which operated within fairly well-defined areas along the main highway from Saigon to Tay Ninh. The first significant contact in Saratoga occurred on 12 December when elements of the 101st NVA Regiment conducted a coordinated night attack on the 1/27th Inf. By 31 January the 271st and 272d NVA Regiments had moved into the Saratoga AO in the vicinity of Cu Chi with the mission of blocking reaction by the US 25th Division during the enemy's assault on Saigon.[14] The engagements during this period will not be recapitulated here but once again it is useful to observe how in the cases of only two enemy Main Force units, the 271st and 272d Regiments, they moved throughout War Zone C, alternately evading or attacking US forces in positions within an area of 2400 square kilometers.

5. NEEDS VS ADEQUACY IN RETROSPECT

(C) The foregoing review of US ground operations in War Zone C points up a number of problems encountered with tactical intelligence in relation to the planning and conduct of operations against enemy Main Force units in the more remote, jungled terrain of Southeast Asia. The problems in turn illustrate some of the limitations and weaknesses of various collection means and overall intelligence systems performance. What is not pointed up are the ways in which these factors interacted to the occasional disadvantage of US tactical unit commanders. Environmental factors, for example, often inhibited or degraded the effective performance of IR and SLAR in satisfying the immediate needs of tactical commanders for intelligence on enemy force locations. The areas of operations were mostly uninhabited (except for the enemy forces) and the opportunities for gathering intelligence from human sources were accordingly restricted. A premium was therefore placed on other collection means. These included SIGINT, Special Operations patrols, visual aerial reconnaissance by Air Cavalry, tactical commanders and FACs, and ground patrols by friendly forces.

(C) Of the various means available, security restrictions governing access to SIGINT and SOG patrol results operated, at that time at least, to prevent timely dissemination of intelligence acquired through those channels to the tactical commanders on the ground. The result was that Air Cavalry, unit and other friendly force ground patrols (mainly by Special Forces advised CIDG) and observation of the AO by tactical commanders from their command and control aircraft were required to bear the burden of the tactical intelligence collection effort.

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Area Security Operations (Pacification)

in the Upper Delta (U)

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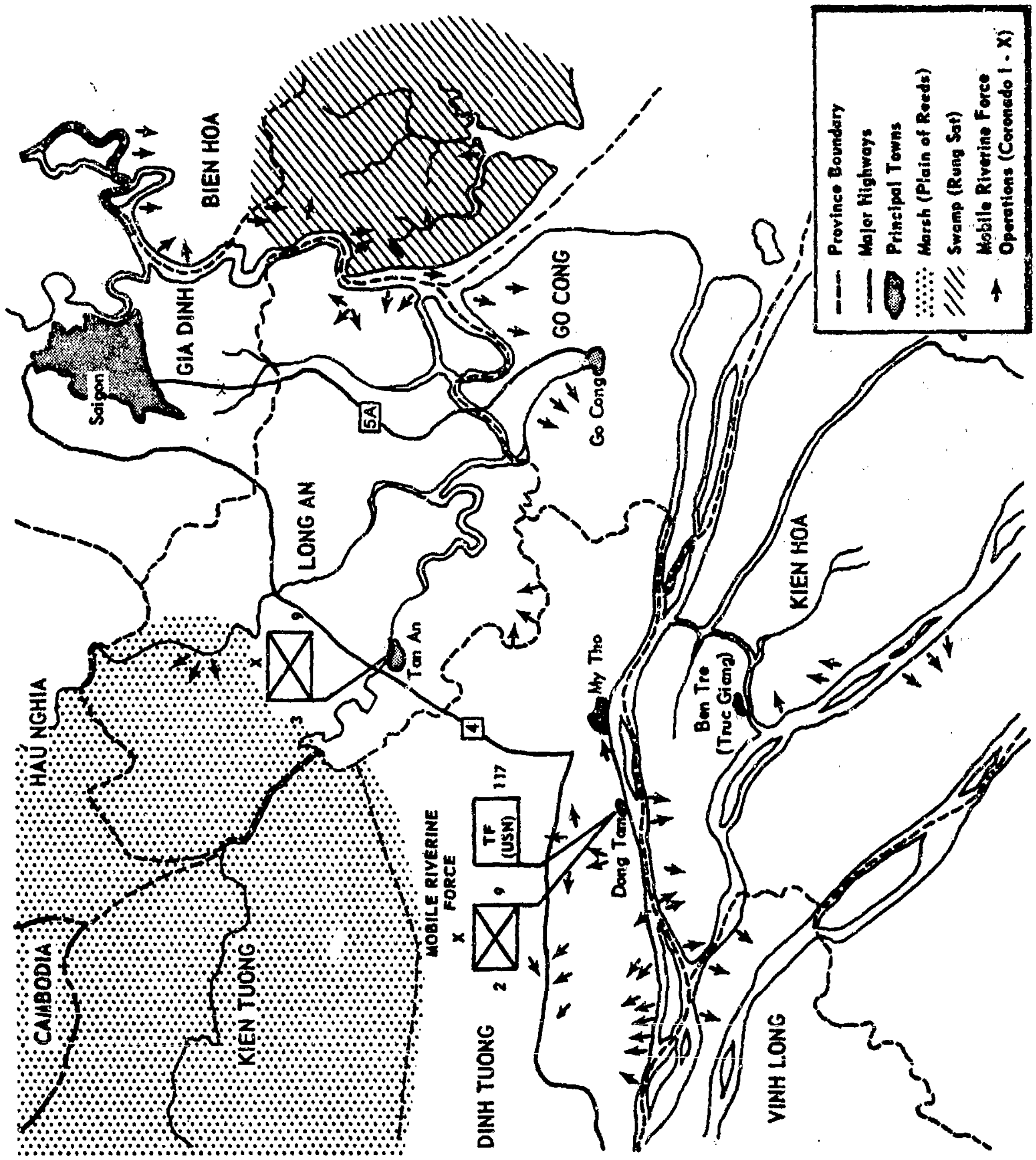

9th Division/TF 117 Operational Area-Upper Delta

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1 INTRODUCTION

(U) While the intelligence problems encountered in area security and pacification operations in South Vietnam paralleled in some respects those of US offensive operations against enemy Main Force units in the War Zone areas (described in Appendix A), on the whole they differed markedly from the latter.

(U) In operations against enemy Main Force elements, for example, the single objective was to seek out and destroy such forces (and their supporting facilities) in the sparsely populated and more remote base areas that provided them cover and protection. In pacification, the basic objective was to establish effective government control in contested areas.

(U) This objective required, in the first instance, the conduct of operations to destroy or neutralize local insurgent armed units. In addition, the insurgent leadership structure (infrastructure) existing in the villages and hamlets had to be rooted out and destroyed. Simultaneously, adequate security and protection had to be provided to that part of the population subject to insurgent harassment, terror and propagandization. Finally, pacification involved socio-economic programs and political actions designed to acquire the positive support of the civilian population on behalf of the counterinsurgency effort. Ultimately, the nexus which linked the various elements of the overall pacification effort together was the role of the local population, the support and allegiance of which both insurgent forces and the government in the long run sought.

(U) Pacification also as a rule differed from Main Force operations in terms of the physical environment within which operations were conducted and the kinds of forces engaged. In contrast to the more remote jungled or mountainous regions which served as base areas for insurgent Main Force units, the populated areas of South Vietnam were relatively flat and open with intermittent vegetation and devoted to rice farming. In contrast to Main Force VC/NVA units of battalion size and up, enemy forces in areas in which pacification operations were conducted were generally local force units of battalion size and lower, down to and including armed bands of part time guerrillas based among the local population.

(U) Other differences are important to note. Main Force operations, for example, were conducted without regard to province or other political boundaries. While pacification operations involving offensive operations against VC or NVA forces stationed in, adjacent to, or entering an area under pacification were similarly unconstrained, the pacification effort overall focused on the province (or cluster of provinces) as the area of interest. Specific pacification programs relating to population protection, targeting the VC infrastructure, civic action and psychological operations (Revolutionary Development) and the control of territorial security forces were channeled through the Province Chief. In short, administrative boundaries, and the administrative structure were of greater importance in pacification.

(U) In this milieu, the role of US combat forces assigned to an area security-pacification mission was quite different than that carried out in Main Force operations. In the first place it was essentially supportive of GVN regular and territorial forces stationed in the area of operations and of the GVN administrative structure. While US combat forces often took the leading role in those operations intended to isolate and destroy enemy local force units—or restrict his movement, disrupt his communications, uncover his caches, interrupt his supply and fragment his unit—these operations (which in one sense were an extension in more fine grain of the tactics required to deal with Main Force units) were generally conducted <u>jointly</u> with ARVN and RF/PF forces. In some cases US combat forces were broken down into company size (and even less) and co-located with GVN territorial forces in dispersed villages and hamlets to provide security to the rural population. Again the role of US combat forces was primarily supportive. In these and other security related operations (e.g., operations against the VC infrastructure), US forces had to coordinate and work closely with GVN forces and officials and their US advisory counterparts. This was particularly the case, of course, as US forces turned more and more to non-combat activities—road building, medical assistance and other civic action activities and training to upgrade local GVN territorial forces—as pacification progressed and the security threat diminished in an area.

(U) Finally, it should be noted that area security-pacification operations varied widely from one area to another in South Vietnam and even within the framework of a single operational area or province. Portions of almost any province (whether in the coastal lowlands or in the Delta) provided excellent cover for organized insurgent local forces and conversely offered problems of access to US and GVN forces, e.g., the Plain of Reeds in Long An Province. In such areas, security operations by US and GVN assault units resembled those carried out in the Main Force war. In the same province, in areas adjacent to those of insurgent strength, the emphasis in pacification might be on population protection and control and reduction of the insurgent infrastructure. In other areas, where the security threat was lower, pacification programs might focus on the local population and on efforts to rebuild the political and administrative structure which may have been damaged or destroyed by years of insurgent attack and presence. The security situation and the mix of programs in short varied from province to province. Thus there is no pure case or perfect model to examine for the special purpose of assessing the tactical intelligence requirements of US combat forces engaged in area security-pacification operations.

2 BACKGROUND TO UPPER DELTA OPERATIONS

(C) The pacification operations selected for examination in this Appendix were those conducted between 1966 and 1969 by the US Army 9th Division and Navy Task Force 117, principally in the upper delta provinces of Dinh Tuong and Long An, but extending into Gia Dinh, Co Cong, Kien Hoa and the Rung Sat Special Zone. These operations were at what might be considered the upper-end of the threat spectrum in pacification (i.e., VC presence was extensive, terror and harassment incidents were high, etc.) and were intended to loosen the hold of the VC on the people of the heavily populated delta provinces in which they were conducted. The operations were carried out by combined US Army and GVN regular and territorial forces on land and by joint US Army and US Navy forces formed into what was called the Mobile Riverine Force designed for operations along the estuaries and canals of the upper Mekong Delta. They include Operation FAIRFAX conducted initially by elements of the USA 4th Division and later by the 199th Infantry Brigade in and around the Capital Military District in Gia Dinh Province in late 1966 and most of 1967; Operation ENTERPRISE carried out by the 3rd Brigade of the 9th Infantry Division in Eastern Long An Province from February 1967 through most of 1968; and the series known as CORONADO operations conducted by the Mobile Riverine Force (2nd Brigade, US 9th Division and Navy Task Force 117) in the Upper Delta from June 1967 to March 1968. (See map.)

2.1 Environmental Factors

(U) The area within which the operations noted above were conducted was typical delta terrain—seamed with rivers, canals and smaller waterways. Much of what land there is is pure swampland that will not support heavy vehicles. Moreover a large portion of the area is flooded for most of the year. The population centers and most of the villages and hamlets are located along the streams and canals.

(U) Pacification operations went on year round. The terrain aspects of these operations, however, imposed very special demands on the military. During the dry season in the Delta, from November to March, movement overland by light tracked vehicles was more feasible than during the wet season, May to October, when the rice paddies were under water. Overland transportation was limited to one major hard surface road, Route 4, which runs from Saigon south to the tip of the Ca Mau peninsula, and a network of secondary roads which were generally in poor repair. But wet season or dry season, the best way to move around the Delta was by helicopter or on water.

(U) For riverine operations, the depth of the waterways in relation to the draft of available boats was the single most critical consideration. Thus a significant environmental factor that had to be taken into account was the effect of the sea tides along the inland waterways of the region. Tidal fluctuations twice a day varied considerably from area to area, influencing not only the depth of the water at different times of the day but also the velocity of the currents. These elements, many of which fluctuate so markedly that they are not susceptible to fine-grained prediction, still had to be considered in planning riverine operations. Because the depth of the water very sharply limited friendly forces to certain water routes, moreover, these routes soon became predictable. Enemy ambushes increased as the enemy became more familiar with the operations of friendly forces. Tidal flooding also affected land operations as well.

(U) Another troublesome factor was the silting of many of the canals and smaller streams, the result of years of neglect during the fighting. And, as in any riverine operation, the height of bridges at high and low tides had to be calculated before plans were made to move forces on these waterways. Thus, much of the tactical intelligence that was of vital importance for the local commander in these operations had to do with questions related to navigability of given stretches of water.

(U) Finally, another feature of the terrain was of signal importance for military operations. Wooded areas, mangrove and nipa palm thickets, hedges and fruit trees, surrounded both the wide-open rice paddies and the built up areas in general. The enemy could mass in these wooded areas or in the nipa thickets; all the approaches to and from his positions were exposed. The open paddies made LZ's plentiful in the dry season but crossing them to the tree lines often resulted in high casualties during the initial stages of an assault. In the wet season, of course, the flooded paddies made progress very slow.[1]

2.2 Enemy Forces

(U) The enemy forces against which the operations were conducted consisted of main force Viet Cong; local VC guerrilla forces and political cadre. In this, the most populous part of Vietnam, with a population density of about 200 persons per square kilometer, the VC had been active for many years and could rely on a number of base areas, in the Plain of Reeds and the Cam Son Secret Zone west of My Tho among others.

(U) In mid-1966, the estimated strength of the VC in IV CTZ, which covers most of the Delta though not the province of Long An, was 82,545. Over 19,000 of these were combat troops; another 1200 were support troops; more than 50,000 were local part-time guerrillas, and some 11,000 were working as political cadre. No North Vietnamese Army units were reported in IV CTZ at that time.[2]

(U) These enemy forces were believed to be organized into three regimental headquarters, 28 battalions, 69 separate companies and 11 separate platoons. Their logistical support came from the population, captured ARVN equipment and supplies infiltrated from North Vietnam either overland from Cambodia or smuggled in by sea. Cambodia, of course, then as throughout the war until mid-1970 provided a "rear service area" for enemy forces throughout the Delta.

(C) In 1967 there were seven VC Local Force battalions and four VC Main Force battalions in the areas of immediate concern to US forces operating in the IV CTZ (VC Military Regions II and III—including Vinh Binh, Kien Phong, Dinh Tuong, Vinh Long and Kien Hoa Provinces) and there were two VC Main Force battalions and two Local Force battalions operating in Long An Province (the portion of VC Military Region II located in III CTZ). In addition some three to four VC Main Force battalions were believed to be operating in Gia Dinh Province and the Capital Military District immediately surrounding Saigon.

2.3 Friendly Forces

(C) ARVN forces in IV CTZ in 1966 consisted of three divisions, the 7th headquartered at My Tho; the 9th with headquarters at Sa Dec; and the 21st headquartered at Bac Lieu. In addition to these three divisions there were five Ranger battalions and three armored cavalry squadrons for a total assigned strength of 40,000.[1]

(U) In addition to these ARVN units there were South Vietnamese paramilitary forces such as the Regional and Popular Forces (RF/PF), Civilian Irregular Defense Groups (CIDG), Provincial Reconnaissance Units (PRU), and National Police. All of these units were assigned to border patrol, police and local hamlet and village defense activities, the key elements in pacification operations.

(U) Vietnamese naval forces then assigned to the Delta included six river assault groups and 11 coastal groups, the Junk Fleet.

2.4 US Forces

(U) The principal US forces assigned to the operational area under discussion have been noted earlier: The 2nd and 3rd Brigades of the 9th Division, the 199th Infantry Brigade (Sep.) and Navy Task Force 117. The latter, together with the 2nd Brigade of the 9th Division, composed the Mobile Riverine Force (MRF). Two battalions of the 2nd Brigade, the brigade headquarters and supporting Army elements were quartered afloat with the MRF, on two APBs, barracks ships converted from LSTs and an APL, a barracks barge. These ships were part of the Navy's Mobile Riverine Base. Tactical lift for the 2nd Brigade was provided by two River Assault Squadrons, equipped with armored, troop carriers (ATCs), command and control boats (CCBs) and Monitors (fire support ships).[1]

(U) Organization and command arrangements between the Army and Navy units of the MRF were unique and were worked out in joint meetings and conferences, one of which—the conference held at the Coronado Naval Base in California in September 1966—gave its name to the series of operations later launched in the Mekong Delta by this joint Army/Navy force. The organization of the MRF Command structure is shown in Figure 2.1.

(U) US Army Forces conducting riverine operations in III and IV CTZ were under the operational control of CG II Field Forces exercised through

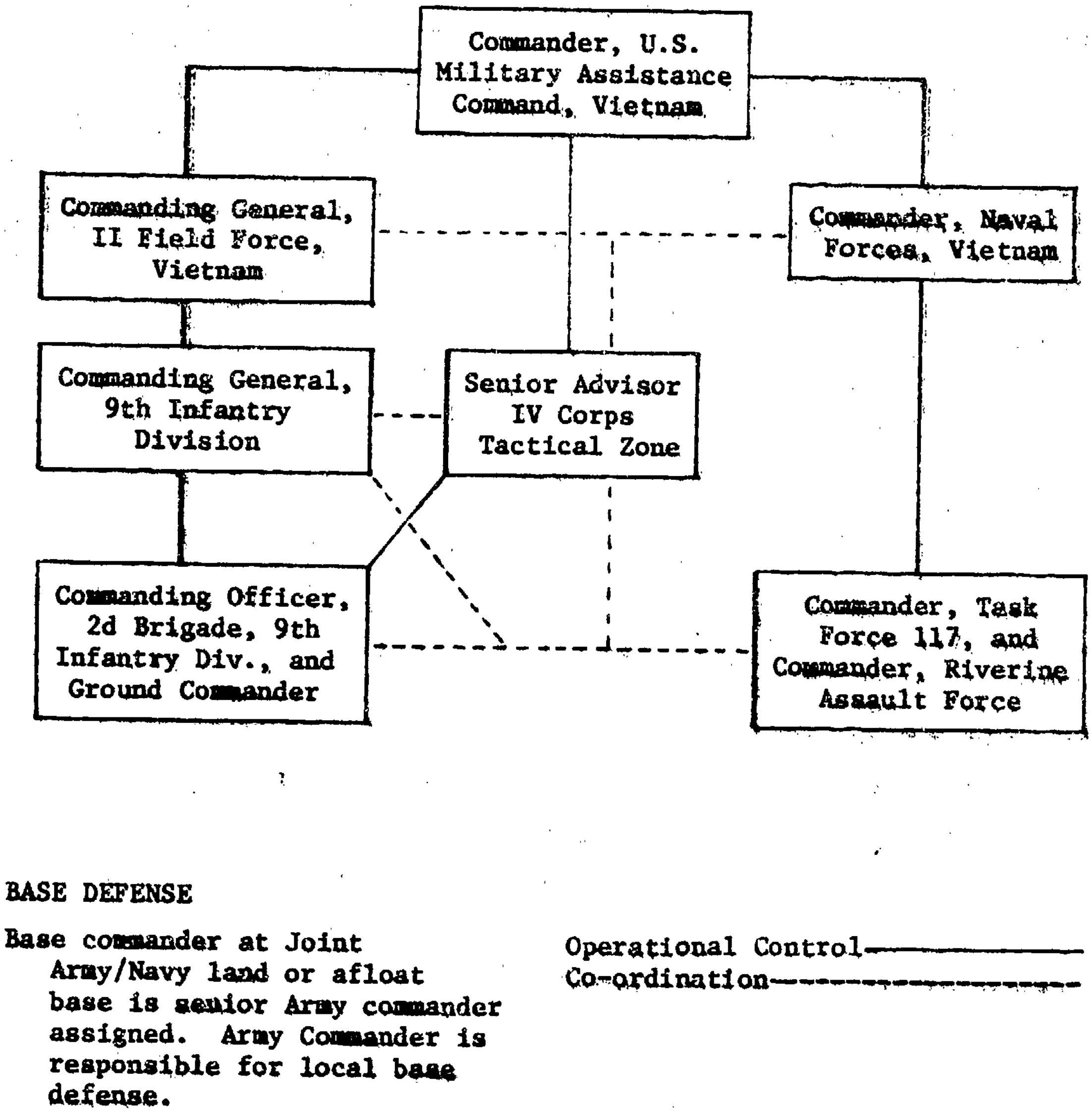

Fig. 2.1 (U)—Mobile Riverine Force Command Structure

the 9th Division. US Navy riverine forces were under the operational control of COMNAFORV who exercised control through the commander of riverine assault force CTF 117. The base commander for the bases, land or afloat was the senior Army commander assigned. Each service retained command of its forces during operations; although the Naval commander was primarily responsible during movement of the force and the Army commander during the actual assault operations.

(U) From the operational standpoint—the brigade commander or a higher echelon Army commander usually selected the enemy target and area of operations. The two commanders, Army and Navy, then agreed upon the general task organization, the tentative duration and timing of the operation and the location of the mobile riverine base to support the operation.[2]

3 MAJOR OPERATIONS CONDUCTED

(U) The operations summarized below illustrate the division of labor that generally applied when US forces were employed in pacification efforts in high-threat areas. US combat units targeted in the first instance on the insurgent armed bands and organized units operating in the area while GVN territorial forces addressed the security threat "closer in" near the population centers. These operations also illustrate the role of US combat forces in meeting the range of operational requirements that needed to be satisfied in the overall pacification mission.

3.1 Operation FAIRFAX

(C) Operation FAIRFAX, one of the earliest pacification efforts in which US forces participated, was conducted from 1 December 1966 to 14 December 1967 by elements of the 4th Division (December 1966) and the 199th Infantry Brigade in the area surrounding Saigon in Gia Dinh province.[3] A major portion of these operations were carried out south and southeast of Saigon in the area adjoining Long An province. This area had experienced an increase in VC-initiated incidents during 1966 and there were indications of marked expansion of the VC infrastructure.[4]

(C) The overall objective was to reduce and eliminate to the extent possible VC influence in this critical area near the seat of the central government by the destruction of VC guerrilla units, identification and neutralization of the insurgent infrastructure and the promotion of Revolutionary Development programs.[5] The infrastructure reduction mission was especially important. In November 1966, a Combined Intelligence Staff (CIS) had been created at MACV J2 urging, which provided a mechanism for identifying intelligence from all sources, evaluating and disseminating it, and especially for pulling together and integrating intelligence on the VC infrastructure. A central registry and data base on VC personalities was established with the initial focus on VC Military Region 4, the insurgent designation for the area surrounding Saigon. Operation FAIRFAX provided an operational arm for the extension of this new concentration of effort on neutralization of the VC infrastructure into the field and in an area of critical importance. The CIS provided direct support to FAIRFAX units in the form of Field Search Units (49-man Police Field Force Platoons) to help perform cordon and search operations, to gather information and to identify and capture members of the VC infrastructure.[6]

(C) The three battalions of the 199th Brigade and the three ARVN battalions involved in FAIRFAX worked closely together. Joint operations were conducted from company-sized bases dispersed throughout the MR-4 region. These operations included search and destroy operations, cordon and searches, small unit patrols and night ambushes to restrict VC movement.* US military personnel also worked closely with GVN officials and territorial forces stationed in the area of operations.

(C) By the end of 1967 the threat in Gia Dinh province had been substantially reduced and Operation FAIRFAX was phased out with continuing responsibility for security in the area passed to local GVN forces. Overall, FAIRFAX was considered to have been a successful effort. Documents captured during the Tet Offensive in early 1968 confirmed that the VC in this area had suffered losses during 1967 that were three times those in 1966.[8]

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*During the July-September period of 1967, the 199th Brigade conducted on the average 77 night ambushes per night.[7]

3.2 Operation ENTERPRISE

(U) Operation ENTERPRISE was carried out in Long An province by the 3rd Brigade of the US 9th Division beginning in February 1967 and continuing through the first half of 1968.

(U) Long An, a province with a long history of VC influence and activity, sits astride Routes 4 and 5, the two major highways connecting Saigon with the southern Delta provinces, the interdiction of which could interrupt the vital flow of food to that population center and seat of government. Long An also buffers Saigon and the Gia Dinh area from the long existing VC base areas in the Rung Sat and the Plain of Reeds. Whoever dominates Long An is in a commanding position either to attack the capital or to starve it, or both.[9]

(C) As with the operations of the 199th Brigade in Gia Dinh province the general mission of the 3rd Brigade in Long An was to conduct operations against VC local forces and their hideout areas, to disrupt their lines of communications and sources of supply, to work closely with local GVN officials in assisting them to neutralize the extensive VC infrastructure existing in Long An and to conduct training to upgrade local ARVN and RF/PF units operating in the area. The three battalions of the 3rd Brigade were deployed in separate districts and concentrated their operations in that particular district. In addition to standard search and destroy, cordon and search, and sweep operations, 3rd Brigade elements also became deeply involved in population control activities (water and land check points, ID programs, etc.) and civic action and psyops programs in support of the GVN Revolutionary Development effort.

(C) 3rd Brigade operations were often [illegible]ducted jointly with GVN local force elements as was the case in Opera[illegible]on FAIRFAX, though somewhat less than in the latter. Over 30% of the operations conducted, however, were undertaken in combination with such forces, often on a paired-off squad with squad basis.[7] US and GVN local force elements also combined in the formation of Combined Reconnaissance and Intelligence Platoons (CRIPs).

These units provided a ready reaction force for the District Chief to call upon in exploiting intelligence acquired at that level. CRIP teams were targeted primarily on the VC infrastructure but also were used for reconnaissance and intelligence gathering purposes and even for reinforcing RF/PF outputs when intelligence indicated a possible attack.[1]

(C) These and other pacification operations in which US forces participated in Long An were coordinated through an Area Coordination Center (ACC) an organizational concept that was applied in the 9th Division area to oversee joint US-GVN force operations at the Province and District levels. Membership on the ACC consisted of the key District officials, local ARVN/Territorial Force commanders and senior US military commander and his S-3, S-2 and S-5 (civil affairs/psyop) staff officers.[1] The ACC was something of a forerunner of the Province and District Intelligence and Operations Control Centers (PIOCC/DIOCC). The PIOCCs and DIOCCs were later to become the organizational cornerstones of the pacification effort in the provinces throughout South Vietnam.

(C) Operation ENTERPRISE was concluded as a specially designated effort in mid-1968 but the 3rd Brigade of the 9th Division stayed on in Long An to provide continuing support to GVN officials in area security-pacification operations. Although there is evidence that 3rd Brigade operations were having a definite impact on the security situation in Long An (the number of VC killed in operations in Long An were twice as high as in FAIRFAX for somewhat similar periods, for example; there was also evidence of increasing cooperation for the local population), it was also true that enemy forces in the area managed to avoid major engagements with US-GVN forces and the contacts achieved, though frequent, were with very small VC elements.* The difficulty in getting a true measure of pacification

* (C) The Operational Report on Lessons Learned for the Quarterly Period Ending 31 January 1968 (II Field Force-Vietnam) in fact indicated that excellent results were being achieved in support of the pacification effort in Long An—e.g., life was returning to normal in villages that had been abandoned, there was a steady increase of former residents returning to their homes, etc. The expanding security presence of US-GVN forces, the extensive work accomplished in repair of bridges, roads, and the increasing tempo of the Revolutionary Development Program were felt to be having measurable impact on the villager's sense of security and overall attitude toward the government and its programs.

progress is illustrated by the fact that the key VC Main and Local Force units located in Long An and its adjacent areas were still able to play a major role (and to fight effectively) in the Tet attacks on Saigon and on My Tho.[8]

3.3 CORONADO Operations

(C) Joint US Army-Navy operations in the Upper Delta were initiated in June 1967 when the Mobile Riverine Force (described earlier) conducted a series of assault operations on Thoi Son Island in the My Tho River and in the Cam Son Secret Zone. Designated as CORONADO I and continuing until 26 July of that year, these operations demonstrated the effectiveness of waterborne counterinsurgency operations in the Upper Delta area. From August 1967 to August 1968, the MRF conducted a continuing series of such operations (CORONADO II through IX) and operated over broad sections of the IV Corps region, as far north as Bien Hoa and east to Phuoc Thuy, in Long An, in the Rung Sat Special Zone, Co Cong, Dinh Tuong, Kien Phong, Kien Hoa and Vinh Long Provinces. The MRF during this time penetrated into areas long regarded as VC controlled and to a large extent was able to take the initiative away from the enemy.

(C) The basic tactic employed by the MRF was to conduct strike operations against known or suspected enemy positions and lay ambushes or conduct other offensive maneuvers designed to drive the enemy against a blocking force or to encircle him. Operations consisted of coordinated airmobile, ground and waterborne attacks, supported by air and naval forces. The ground and naval combat elements traveled to the scene of operations by river craft, helicopter or both. Although the primary assault force (and barge-mounted artillery) continued to arrive at the scene of operations in the troop carrying watercraft, as the CORONADO operations progressed it also became clear that airmobility was also essential to effective riverine operations. It was also necessary to have a command helicopter aloft carrying a commander, a fire support coordinator, an S-2 intelligence officer, an S-3, and necessary radio communications.[2] After initial CORONADO operations, the Mobile Riverine Force routinely requested and planned for the use of aircraft in the conduct of operations.

(C) Still, it was the use of the riverine craft itself that gave the MRF its special capability and mobility. Because it was based afloat and moved throughout the upper delta area, there was little disruption to the civilian community or adverse economic impact. The MRF was not in competition with the civilian population for the limited dry land available nor was it dependent on the land LOCs (and their maintenance) for its operations. With the completion of the CORONADO series of operations in July 1968, the Mobile Riverine Force, having demonstrated its effectiveness in the use of waterways to deny the enemy areas where he had previously operated with relative freedom, entered upon a new phase of operations in association with additional 9th Division elements (including the Division Headquarters, itself) now moving into the region to step up the tempo of operations in the Mekong Delta.

3.4 Operational Concepts in Pacification

(C) With the introduction of additional US military assets, pacification operations in the Upper Delta took a new turn. The key tactic employed was a greatly heightened tempo of operations against local VC forces. Called the Constant Pressure Concept by the senior US commander responsible for the operations of US forces in the Delta, it is perhaps best described in his own words:

> "The Constant Pressure Concept paid off in cold results; however, in retrospect, its real strength was that it largely disrupted a Communist concept of operations which had proved successful since the early days of the Indochinese War.
>
> "The classic method of operating for a Communist unit (NVA or VC) was to take refuge in a relatively secure base area and spend some weeks reorganizing, retraining, and replacing losses of men, materiel and supplies. During this period, it would carefully plan a set-piece attack on a government unit or objective and then execute the attack with the actual movement to the attack, the attack itself, and the withdrawal taking place in a short period of three or four nights or less. If the attack, due to careful preparation, was reasonably successful, the government strength and confidence dropped and the more confident enemy recycled the whole operation.

"With the Constant Pressure Concept, friendly units upset the enemy timetable. By means of constant reconnaissance, small engagements with enemy units and pressure on their bases, the Communists were no longer able to rest 25 days a month; they could not refit and retrain and eventually could not even plan new attacks very well, much less execute them.

"This process is very difficult to measure in any finite way. However, as a pure estimate, if the friendly forces (all types) in an area can attrit the enemy about 5 percent a month and achieve a friendly-initiated/enemy-initiated contact ratio of 3 to 1, friendly forces have the initiative and the enemy slowly goes downhill. In this situation, pacification proceeds and compounds the enemy's difficulties by separating him from the people who had previously helped him (willingly or unwillingly) with recruits, food, labor, information, etc.

"The best performance to my knowledge was in Long An Province where in 1969 and 1970 the friendly forces were able, months on end, to attrit the enemy about 10 to 15 percent a month and achieve a contact ratio of about 6 to 1. This paralyzed and eventually almost disintegrated the enemy, even though the Cambodian sanctuaries were nearby. This military pressure, coupled with a dynamic and most effective pacification program ... brought Long An from a highly contested to a relatively pacified area in about two years."[10]

(C) The above is worth citing not only because of the application of a successful operational concept but because of its implications for tactical intelligence collection. The constant reconnaissance tactic and continuous random (but designed) search operations described, rely less on traditional intelligence sources and the intelligence process cycle than on immediate target acquisition capabilities coupled or integrated with the tactical force elements while conducting actual operations.

4 INTELLIGENCE NEEDS IN PACIFICATION OPERATIONS

4.1 Intelligence on Enemy Forces

(U) A proposition that appears to be sustained over and over again in any review of pacification operations in Vietnam is that, although the ultimate objective of the counterinsurgency program is to gain the support and trust of the population being subjected to political subversion, this is not likely to be achieved unless the armed insurgent forces and their clandestine leadership have been reduced to the point that they can no longer exercise their influence on the population at large. When exactly this point is reached is arguable. But it is clear that existing armed insurgent elements must be either destroyed or attrited to the point where they can no longer operate as an organized force, or driven out of the area of contact with the population. It is also clear that the village infrastructure must be destroyed or neutralized before government programs to gain popular support can operate effectively. In the pacification operations considered in this case study, the initial and primary intelligence requirement related to operations against the enemy armed units and the insurgent leadership.

(U) Enemy Unit Locations. As in main force operations in the War Zones, area security and pacification operations had as a priority intelligence requirement information on the location of the armed insurgent units operating in the area. This was especially so in Upper Delta operations where the enemy scrupulously avoided contact both on land and in the riverine network. The information required was of a somewhat finer grain than in the larger scale War Zone operations. VC Local Force units tended to operate in smaller elements (even as individuals in a sampan), were frequently on the move, and often "snuggled up" to outlying population centers. Operating independently and smaller in size, hideout and base areas were obviously also harder to detect.

(U) Enemy Strength and Composition. These became relatively more important factors in pacification operations. Local Force units varied greatly in their strength levels as a function of the demands placed on them from other operating areas, the operational situation itself, recruitment success in the local area and even with the season (e.g., harvest time). Composition was also an important question in the sense that it was extremely important to know if NVA fillers were being infused into Local Force battalions.

(U) Enemy Offensive Tactics. The primary threat to US and Allied forces engaged in pacification operations came from ambush and mines. A key intelligence requirement in these operations therefore related to advance warning and knowledge of likely sites for this kind of attack.

(U) Command Subordination. While significant in Main Force operations, this consideration was also important in Pacification because of the shifting nature of insurgent unit deployments, and the need to assess the effectiveness of area security operations in grinding down and neutralizing insurgent units operating in the area.

(U) Enemy Logistical Operations, LOC and Support Systems. Information on the sources of supply (especially food and ammunition) for enemy local force units and where caches and supply stocks were maintained could be of great value in the attritive type campaign characteristic of the more successful pacification operations. Important also was information on and knowledge of the infiltration and exfiltration routes used by local and interregional insurgent forces entering and leaving the area. If the vital link between the insurgent's village support base and the link between local insurgent base areas and other areas of insurgent strength could be interrupted, the task of chasing down and destroying the insurgent armed bands was that much easier. As support is reduced and supplies diminish, moreover, the insurgent elements increasingly risk exposure.

(U) Enemy Weapons. The weapons available to local force units tended to remain standard. However, it was important to know if new weaponry was being introduced into the area and the firepower of local units being upgraded (e.g., with AK-47s, RPG-2s and 7s).

(U) Leadership Cadre and Village Infrastructure. Next to insurgent armed unit locations and the supporting intelligence necessary to find, fix and destroy these units, the most critical intelligence requirement in pacification operations related to the insurgent leadership and village infrastructure (the VCI). The operational requirement to root out the VC infrastructure, preferably by capture, if need be by wounding or killing, generated a need for very specific intelligence—more traditionally in the police vein. Who were the local leaders of the insurgent organization? What were their habits? Who were their principal supporters? Did they live in the hamlet or village or hole up in safe areas, emerging as needed?

4.2 Intelligence on the Environment

(U) For commanders conducting area security operations in the upper Mekong Delta, an additional set of tactical intelligence requirements was crucial. This had to do with the peculiarities of military operations conducted in a riverine environment.

(U) The land portions of the area of operations had to be reconnoitered or studied from available data to determine possible helicopter landing zones, promising artillery positions and the like. For purposes of riverine patrolling, data had to be collected on the following for the given area of operations: depth of water; height of banks; tides (time, duration, speed); height of currents; vegetation in the water (how much, what kinds); types of enemy craft in the area; any identifying or likely identifying marks; sites of previous ambushes; pattern of normal river traffic (quantity, time of day, types, i.e., identifying marks, types of sampans, types of cargoes, numbers of passengers, ages, occupations, local identifying characteristics); curfew ~~regulations and history of their~~ observance.

(U) The relevance of most of these data items to riverine operations are obvious. The depth of the water was, of course, critical to the movement of boats on a given stretch of water. The height of the banks was pertinent to the delivery and extraction of troops, the field of fire for friendly vessels on the river and the degree of cover provided for hostile forces targeted against the friendly boats.

(U) Information about tides was vital. Tides not only affect the depth of water in the rivers and canals but can cause significant changes in the velocity and direction of the current. Traveling upstream against an outgoing tide generally requires far more time than traversing the same route on an incoming tide. Tides, draft and maneuver room were primary considerations when, for example, boats were scheduled to rendezvous with Army forces for pickup as well as for scheduling coordinated operations approaching a given target area from several directions.

(U) Thick vegetation in the water was a significant problem on many Delta rivers and canals. While the amount of vegetation in a given stretch of waterway could not be predicted precisely, any more than the extent to which it might impede the progress of a given boat, its reported presence in quantity had to be factored in, in any estimate of the time for riverine craft to traverse a particular stretch of waterway. Boats frequently had to halt to free themselves of vegetation which had become entangled in the struts, rudder, shaft or propeller.

(U) Information on the pattern of local riverine activity—the amount, time and type of normal river traffic, sites of previous ambushes, distinguishing characteristics of enemy and friendly rivercraft—were all needed to enable friendly forces to pick out early enough the appearance of any craft or group of craft not in harmony with the established pattern of friendly activity. Finally, if curfew regulations had customarily been flouted in a given area, the appearance of craft on the waterways during the curfew hours was likely to be of considerably different significance from the appearance of craft after curfew in places where regulations were strictly enforced.

(U) To sum up operations conducted in support of pacification in the upper Delta included the whole range of security operations, from routine patrolling to search and destroy. For these, information was gathered on factors peculiar to riverine operations, such as tides, water depths, water obstructions, bridge clearance, distance of the mobile riverine base from beaches, availability of waterway routes in the area of operations, suitability of river banks for landing sites and mooring for barge-mounted artillery. The intelligence annex to each operations order covered terrain, weather and such details on the enemy situation as the threat to assault craft including descriptions of recent enemy action along the waterways, location of enemy bunkers, kinds of enemy weapons likely to be used, and water mine and swimmer danger.

4.3 Population Data

(U) In addition to the need for standard enemy order of battle information, enemy capabilities, modus operandi, etc., tactical commanders in pacification operations needed political, economic and sociological data on the population in the area of operations. This, perhaps more than any other intelligence requirement distinguishes pacification from operations against enemy Main Forces in the War Zone areas.

(U) Linkages with Enemy Forces. Tactical commanders were interested in whether the area to be secured was one in which the enemy had enjoyed strong popular support for a long period of time. In pacification, far more than was the case for operations against main force units, it was useful (often essential) to know the degree of friendly and enemy support in settlements along the river and canal banks and adjacent to any proposed landing zones or artillery positions. It was also important to know whether the area of operations was a rice-rich area which contributed to the enemy logistics support. And if so, was this support given voluntarily or extracted by force? Was the majority of the population ethnic Vietnamese? Areas in which Chams and Cambodians predominated had a markedly different relationship to the province leadership and GVN forces than did ethnic Vietnamese areas. Did refugees from North Vietnam comprise a large segment of the local population? All these seemingly non-military facts could have great bearing on the success or failure of military operations in the area.

(U) Factors Affecting Population Control. Population control activities was another task often required in pacification operations. This required establishing checkpoints and monitoring the movements of people. To carry out such operations successfully, detailed information was necessary about typical patterns of movement by time of day and of week, and about the specifics of the composition and customary behavior of the local population.

(U) Population Attitudes. Of less direct interest to tactical commanders, but important in achieving the objectives of pacification in the long run, was knowledge of the population's attitudes toward the central government and an understanding of what was expected or wanted from government agencies and their officials. What deep-seated grievances, if any existed? Since one of the objectives of pacification was to demonstrate the government's ability to provide security to a segment of its population under threat, what in fact constituted "security" in the minds of the population so threatened—what prerequisites had to be met? All of this was important to the planning for socio-economic programs intended to elicit the support of the local population and acquire its active cooperation in the counterinsurgency effort.

4.4 Information on Friendly Forces

(U) While not properly included as an "intelligence" need, as such, it is worth noting that information on the characteristics and capabilities of friendly local forces was very important in pacification. As mentioned earlier, US forces worked very closely with ARVN and the GVN Territorial Forces in pacification operations and were dependent in large measure on their support and cooperation. US participation in pacification operations moreover was predicated on the assumption that the US role, whether a leading or supportive one, would be turned over to GVN forces as pacification successfully progressed. The better the degree of knowledge of local force capabilities and deficiencies, the better the task of training and upgrading those capabilities could be met.

5 INTELLIGENCE COLLECTIONS MEANS AND SOURCES

(C) On the whole the most useful sources for intelligence collection in support of pacification operations in the Upper Delta came from HUMINT rather than mechanical, electro-magnetic, electro-optical, or other black-box devices introduced to deal with the special problem of locating the enemy in the Vietnam conflict environment. Some of the reasons for this, exceptions to this pattern, and caveats that should be noted are indicated below.

5.1 HUMINT Sources

(C) Patrols. Long Range Reconnaissance Patrols (LRRPs) and regular patrolling activity were a useful source of intelligence information but were also somewhat limited in their application in the delta environment. The tendency, moreover, was to use LRRP and similar special assets less as intelligence gatherers than as action forces for ambush operations, "snatch" missions, and as quick reaction elements. An example was the Combined Reconnaissance and Intelligence Platoon (CRIP) employed very successfully in Long An to exploit intelligence acquired by the local DIOCC (especially intelligence relating to VC infrastructure targets). One form of patrol that was used very effectively for intelligence gathering purposes, however, was the Medical Civic Action Patrol (MEDCAP). These patrols came in contact with the local population in a context (provision of medical assistance) that was very conducive to information collection. As a consequence, MEDCAPS (later ICAPs) became a very important source for the collection of low-level intelligence and also one of the most reliable.

(C) Friendly Sources (ARVN, RF/PF, DIOCC/PIOCCs, etc.). Because US intelligence assets in the Delta were limited, a heavy reliance was placed on intelligence information acquired by counterpart intelligence organizations. When effective working relationships were developed, and common intelligence files established, the intelligence take from GVN counterpart organizations became exceedingly important. On the other hand, there were problems with this intelligence source. The number and diversity of GVN counterpart intelligence sources involved made coordination a very difficult task. Secondly, Vietnamese agencies, as a rule, were not oriented toward intelligence needs of tactical units or for passing "real time" intelligence.* The tendency was to wait for "confirming" reports. These were overcome, in part, by the establishment of province and district level focal points for the integration and analysis of intelligence from all sources (the PIOCC/DIOCCs) and by stationing US tactical unit liaison personnel at important GVN headquarters and district and province centers.

(C) Agents. The lack of agent coverage and the often fragmented character of the tactical AOs in critical areas of US operations caused US units in the delta to develop their own agent nets. Although not normally a US tactical echelon function, these agent nets proved quite effective as they were built up over time and experience was acquired. Because these nets were developed unilaterally they could be targeted by US forces on specific missions, an advantage in achieving a closer tie-in between the intelligence and operations (S2/S3) functions.

(C) POWs and Ralliers. These sources too proved to be very important for intelligence collection in the delta. Ralliers, of course, having made the decision to defect were generally quite willing to talk. Somewhat surprising was the willingness much of the time of POWs to provide information. The drawbacks to this intelligence source were that ralliers and prisoners were often not privy to the larger picture of enemy operations and intentions and that their exploitation for tactical purposes was hampered by the lack of IPW capability at the lower tactical echelons. If the latter was not available, the time lag for information to come back down from interrogation centers higher up made the intelligence of little value for tactical operations. Some battalion commanders used their available interpreter assets to develop a capability for interrogation of POWs and Ralliers in the field, so that "spot reports" could be developed and information of tactical value immediately passed on. The main problem here was the lack of technical expertise—the capability to recognize important and relevant intelligence data—on the part of lower level interpreter personnel.

*Even though information received from Vietnamese sources during early US operations in the delta seldom arrived in time to serve as a basis for an attack, it was useful in tracking the enemy's routes, logistical support facilities, and length of stay in bases.[2]

(C) Captured Documents. Captured documents were a highly important source of intelligence on the enemy order of battle (what units had entered the area, what new units created or reactivated, command and control relationships between VC sectors and regions, etc.) and often provided information that could be used directly in operational planning. In one instance, for example, 9th Division elements apprehended five NVA prisoners from a lead element of a large enemy unit (initially targeted by agent reports) carrying documents; interrogation and analysis of the documents disclosed the size, strength and assigned operational areas for the NVA unit infiltrating from Cambodia to Long An province. This information in turn enabled the division to gain additional and almost continuous contact with other elements of the NVA unit resulting in heavy losses and final dispersal of the enemy."[10] The drawbacks in exploiting the potential of captured documents for immediate tactical purposes are similar to those noted above for POW and Rallier sources, however. In another example, this time for riverine operations in the Rung Sat Special Zone, documents captured at night from a group of five sampans included maps showing the location of a VC regional headquarters and various stops made by the sampan owners along the route they had traveled. One document showed delivery of arms to specified VC units and compromised an entire VC signal system. "Although the general nature of the contents and their importance was immediately apparent to the battalion commander, he was obliged to send all the documents to the senior advisor of the Rung Sat Special Zone. Although he dispatched them immediately, no translation was received for more than a week—too long a delay to permit timely exploitation."[2]

(U) Information Volunteered by the Population. In one sense this is the most important source of intelligence in pacification operations because the linkages between insurgent units and the civilian population make it impossible for the latter not to know a good deal about these units, their operations and their village supporters. The problem is that civilians were less willing to provide information when the prospect of insurgent retaliation exists. Ironically, when the pacification effort started to become effective in the Delta (i.e., the armed bands began to break up and become harder to find) HUMINT from this source was less useful because the population itself knew less. The extent to which such information is volunteered, however, provides perhaps the best measure of progress in the pacification program—a measure of to what extent the population itself is beginning to feel "secure." That sense of security derives not only from the visible effects of government security operations against insurgent units, but also from the conviction gained that government security forces are "there to stay."

(C) FACs and Air Cavalry Patrols. Continuous aerial surveillance in the tactical area of operations not only provided another very important source of information on the enemy but when coupled with other sensing devices to enhance observation (at night or in jungled terrain) and with a ready reaction force, provided something close to a near real time intelligence-target acquisition system in pacification operations. This technique was vital to strategies based on applying constant pressure on the insurgent units operating in the area.

5.2 Non-HUMINT Sources

(C) Although in principle, the capabilities of signal intelligence equipment, radars, sensors and other technological offerings made available for Vietnam should have provided effective solutions to many of the intelligence collection problems in a pacification environment, for a number of reasons they generally rated as less useful than HUMINT sources. There were important exceptions of course. The hand-held camera used by FACs proved very important in getting quick photographic coverage of suspected enemy activity. Aerial strip photography itself was important, even essential, for tactical commanders in planning operations and in acquiring basic knowledge about their area of operations. Excellent results were also achieved in 9th Division operations with the Airborne Personnel Detector (People Sniffer) when care was taken to observe all the operational constraints in its employment, to use trained and skilled operators and to fly appropriately designed search patterns.*[11]

* (U) In terms of the percentage of significant readings confirmed, the People Sniffer rated as the most reliable source of intelligence in 9th Division operations during the period 1 March-23 April 1969. This confirmation rate (30%) resulted without question from the fact that People Sniffer readings were obtained in real time, with air cavalry and infantry resources on the spot available to react almost immediately.[10]

(S) On the other hand, sensor devices such as infrared aerial surveillance produced useful information on possible enemy locations and activity, but difficulties in discrimination limited their potential value. Residual fires from artillery and air strikes added to the discrimination problem for IR. In well-traveled and moderately occupied areas, moreover, the fires detected might be enemy, friendly, or simply agricultural burn-off or wood clearing operations.[3] Side looking airborne radar (SLAR) faced similar environmental problems. While judged successful to a degree, the presence of heavy vegetation, the fact that canals were below ground level, and that VC movement was in small, slow moving craft (sampans) limited its detection capability. Careful, accurate interpretation of SLAR imagery with extreme attention to detail was also required.[3] In the case of both the IR and SLAR systems in the Mohawk aircraft, the problem was the lack of real-time readout for tactical response to suspected enemy identifications. Given the inevitable delay in the reporting back of results, there was little that could be done to react to the small, soft and elusive targets that were presented by these systems. SIGINT ADF techniques also offered tremendous promise for detection of insurgent armed units. This carefully controlled system, however, paid a penalty for over-compartmentalization. Information received in the field generally traveled up a special chain and was subject to analysis before release of specific intelligence that could be acted on by tactical commanders. Unattended ground sensors also offered a great deal of promise as a means of providing intelligence on enemy movement and for providing targeting information for firepower reaction systems. During the time covered by this case study examination, however, the Duffle Bag program for the introduction of unattended ground sensors for use in ground operations in South Vietnam was still in its infancy. There are indications that later more general reliance began to be placed on these more sophisticated intelligence collection systems in pacification operations.[12]

6 FACTORS AFFECTING TACTICAL INTELLIGENCE EFFECTIVENESS

6.1 Organizational Problems

(U) Coordination. The large number of intelligence units involved in pacification operations, and the number of reports generated, imposed a coordination problem of very severe dimensions for US tactical commanders. Table 6.1 below provides a list (and only a partial list at that) of intelligence sources used by the 9th Division. The number is impressive.

(U) The number of special intelligence organizations created to meet the wide-ranging needs of pacification operations also complicated the coordination problem. Combined Reconnaissance Intelligence Teams (CRIPS), MEDCAPs, ICAPs, and others have already been mentioned.* In the case of the Mobile Riverine Force, a special survey team had to be formed to develop information about the waterways. The Mobile Riverine Force operations also illustrate the requirement for coordination and a division of labor between US service elements in the intelligence area in Vietnam. While the Brigade S-2 and the Flotilla N-2 worked closely together in collecting intelligence to support operational planning, the N-2 would concentrate on the navigability of waterways and threats to the Navy ships and assault craft while the S-2 would gather intelligence necessary to conduct land operations. Similarly, the riverine survey team would record depth soundings and clearance measurements, thus providing reliable navigation data for subsequent operations, while the 9th Division engineer collected information on bridges so that the riverine force could be sure of vertical and horizontal bridge clearance on the waterway.

(U) Centralization vs. Decentralization. There is very general agreement that the intelligence system for supporting tactical operations in counterinsurgency must be responsive and that it must be flexible,

*One not mentioned is the MICAT (Mobile Intelligence Civil Affairs Team) formed by the 2nd Brigade from the S-2, S-5, POW Interrogation team, Psyop team and Military Police platoons to coordinate intelligence collection with GVN officials and the intelligence elements of military units during MRF operations.

Table 6.1 (U)

Partial List of 9th Division
External Intelligence Sources[10]

ARVN	US
G2/SA G2 IV CTZ	G2, II FFV
G2, 7th ARVN Division 25th ARVN Division	G2, CMAC
S2, Province: Long An Dinh Tuong Kien Hoa Go Cong	G2, 25th Division S2, 199th Bde CO, 3rd Cmbt Intell Bn (III CTZ)
S2/DIOCC Districts	CO, 4th Cmbt Intel Bn (IV CTZ)
Phung Huong/Phoenix Committees for each Province (4)	CO, 73d SAC (Mohawk), III CTZ
Province Chieu Hoi Centers (4)	CO, 244th SAC (Mohawk), IV CTZ
Province Interrogation Centers (4)	MACV J304 (Unattended Ground Sensors)
Province National Field Police (4)	Combined Intel Center Vietnam (CICV)
Chief MSS, III & IV CTZ	Combined Military Interrogation Center (CMIC)
S2, 44th Special Tactical Zone	Combined Document Exploitation Center (CDEC)

given the nature of the operational problem. There is less agreement on the question of centralization vs. decentralization of the intelligence process. One view holds that the intelligence process must have strong centralized control and not be fragmented to support individual commanders. The argument for direct passage of intelligence upwards to higher levels for a scrubbing of the data and then dissemination of relevant portions to appropriate field commanders is that the individual pieces must be fitted together at a point where the "bigger picture" can be developed. It holds further that units fragmented in the field do not have the perspective, experience, expertise or the resources to effectively exploit intelligence that becomes available.

(U) The other view, taken by most lower level tactical commanders is that, while in principle centralization is a good thing, in practice, especially in Vietnam, it simply slowed things down to the point that often the intelligence became useless long before it found its way back down to the local commander. It is interesting to note that in the 9th Division the command principle that applied was: initial centralization and control of all intelligence assets followed by decentralization to the lowest echelon capable of operating the asset. The rationale was that initial control of these assets at division level was necessary to bring particular intelligence sources into harmony with the operating "division concept." Once this was accomplished, the presumption was that the source could be turned over to the appropriate brigade or battalion.[10]

6.2 Adequacy of Resources

(S) Personnel. A review of intelligence operations by Army and Navy commands in the Upper Delta during the period under consideration, does not indicate that headquarters and subordinate commands were seriously short of personnel to fill assigned intelligence staff positions. A recurrent theme, however, is the need for intelligence "specialists" with special training and preparation for Vietnam assignments. Although the Vietnam war offered a unique challenge to the intelligence school system of all services, the evidence suggests that the special needs for analysis in the Vietnam conflict environment were given only moderate priority in the light of the intelligence community's worldwide responsibilities. In any case, the Vietnam experience—pacification operations at any rate—demonstrates the need for professionally trained intelligence personnel who understand the intelligence problem in mid-to low-intensity conflict and who can apply their skills at the lower tactical levels. One senior Naval intelligence officer at the end of his tour in 1969 recommended: a much higher priority to intelligence training and the intelligence problem in the Navy; that only officers in the top 10% be sent to intelligence billets in Vietnam; a sharp increase be ordered in the number of intelligence specialists trained for Vietnam; incentives be provided for repeat tours in Vietnam; and that the Naval intelligence organization be upgraded as an organizational entity in direct support of the Commander of Naval Forces-Vietnam (COMNAVFORV).[13]

(C) Training. The desirability of more and better specialist training for intelligence assignments in Vietnam-type conflicts has been noted above. For the special case of pacification operations, it need only be added that the importance of knowledge of the language and the history and customs of the people in the area of assignment is even of more critical importance than for other kinds of operations.

6.3 Security

(U) Pacification operations in the Upper Delta also reaffirmed the importance of security in complex operations of the type undertaken (mobile riverine warfare) in an insurgency environment. While the US was dealing with an enemy who was unsophisticated in some respects, that is, in technological matters he was far from simplistic in such matters as monitoring our communications and drawing conclusions from data we inadvertently gave him, as well as capitalizing on everything we gave away freely by carelessness.

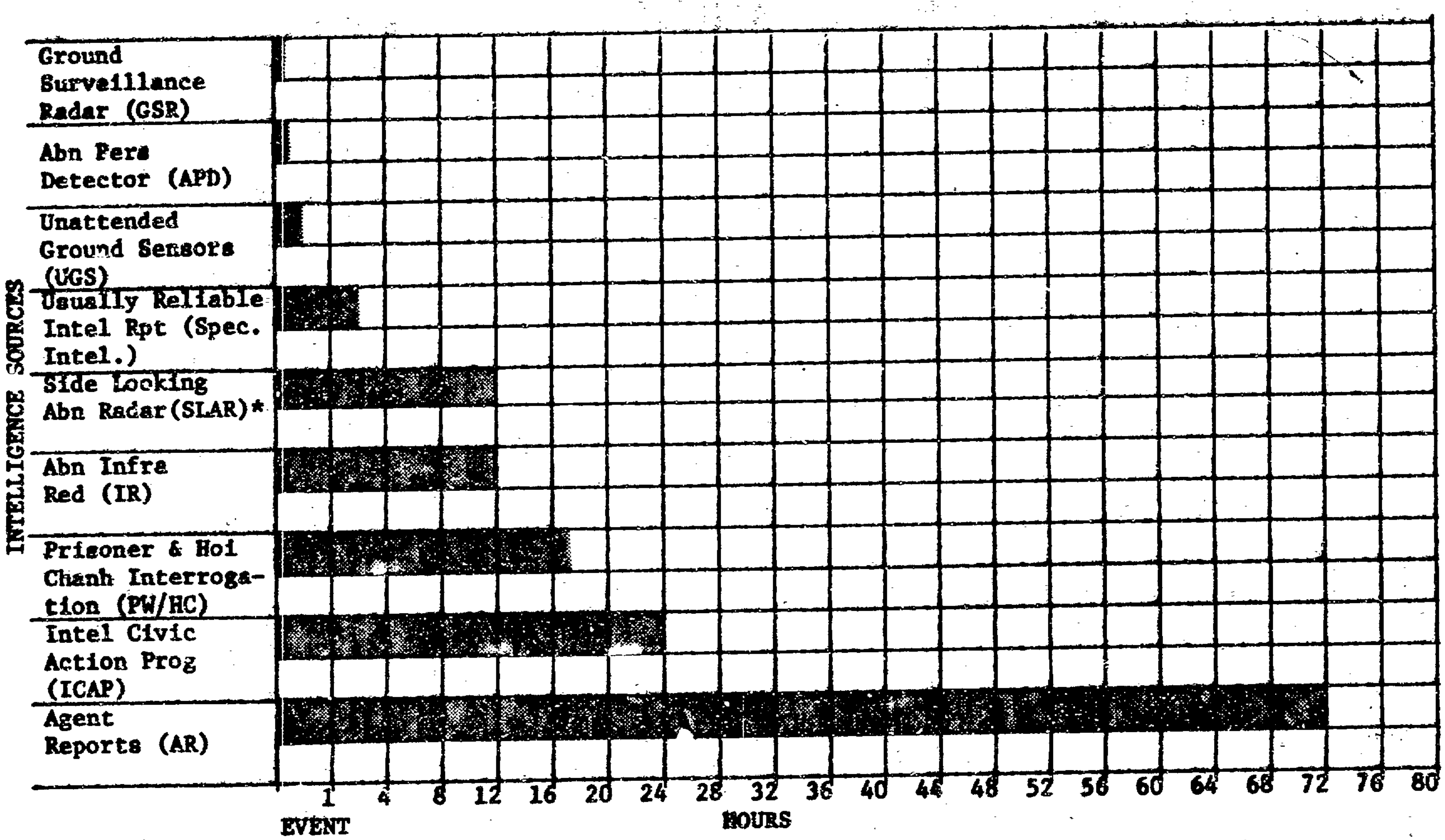
(U) Their success in much of this was not so much a function of their expertise in countermeasures as in our lack of enforcing normal security measures because of underestimating the enemy's capability, sometimes. For example, boats scheduled to engage in major riverine operations, a patrol or even a change of location, normally had several days of down time prior to major operations. Observant VC informants soon were able to date the probable time of our operations by noting when the down time began. The practice of maintaining 24 hours of radio silence prior to an operation pinpointed the time of the planned operation if that had not already been accomplished by the down time of the boats. On the matter of radio communications, US forces relied heavily on speaking fast and in current slang but the enemy's resources were not limited in this area either.

6.4 The Importance of Analysis

(U) Finally, pacification operations in Vietnam also reaffirm the criticality of the immediate tie-in of intelligence to operations and the importance of continuous analysis of the intelligence process itself.

(U) As noted earlier, the timeliness of intelligence was perhaps the single most important factor in maximizing the contribution of intelligence to tactical operations. In this regard it is interesting to note the results of a study of 9th Division intelligence reports received in each brigade area during the period 1 March through 30 April 1969.[10] Figure 6.1 indicates the average hours elapsed from an event or activation of a sensing device to the receipt of the report by the 9th Division G-2 Section. As one would expect, sensing equipment used for surveillance and intelligence purposes provides for much more timely reporting of information. However, what the figure also shows is that it is possible to measure the differences in reporting lag time for the range of intelligence collection means that may be available. These in turn may be related to other factors of significance to the overall effectiveness of the intelligence process.

(C) The relative reliability of the information obtained through the variety of collection means available is obviously another important factor. In the study referred to above the number of reactions to the



*Without Ground Sensor Terminals.

Source: Reference 10

Fig. 6.1 (U)—Timeliness of Intelligence Reports

Average hours elapsed from event to receipt of report by 9th Div G2 Section.

intelligence reports received (8,172 reports for all sources during the two-month period) were noted and confirmations of the correctness of the intelligence reported were listed.* Overall, over 30 percent of all intelligence reports were reacted to and almost 30 percent in this category were confirmed. This high level of intelligence activity correlated with the period when the division obtained its highest number of enemy eliminated confirming that intelligence effectiveness and operational effectiveness go hand in hand. Analysis of the data also indicated the relative reliability of the various information sources. The overall confirmation from Agent Reports was 14.8 percent, for PWs and ralliers, 11.4 percent, for special civic action intelligence patrols, 18 percent. These were much higher than the confirmation levels for mechanical collection means, e.g., 4.4 percent for infrared emissions, and 7.0 percent for special intelligence. On this basis alone, the reliability of intelligence from HUMINT sources was appreciably higher than the intelligence obtained from sensors. On the other hand, the quantity of sensor data was so much greater than that received from human sources that the actual total of confirmed intelligence reports from that source was only half of the number of confirmed sensor reports.

(U) Interestingly enough, the most reliable source of intelligence in the 9th division during this period was the People Sniffer which had a 33 percent confirmation rate for all significant readings. The critical factor here was that People Sniffer readings were obtained in a near real time operational context with air cavalry and infantry resource available for quick reaction.

(U) The data obtained by the 9th division during the period of this particular study might not be repeated in other time frames or in other areas of operations, of course. The point is, however, that systematic evaluation of all intelligence collection means in such an operational

*Confirmation was defined as tangible evidence indicating the validity of the report: contact with the enemy, discovery of documents, caches, trail activity and so on.

context can lead to more effective utilization of intelligence resources and to greater "pay-offs" in terms of the contribution of intelligence to the operational mission. The Commanding General of the 9th Division, commenting on the results of the study referred to above, noted: "In retrospect, we did not realize until late in the game the advantages to be realized from the systematic evaluation of all intelligence modes as to their effectiveness and pay-offs. This was one of our major failures."[10]

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Air Interdiction Operations

in the Laotian Panhandle (1968-72) (U)

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FIGURE

1. INTRODUCTION

(C) Air interdiction in Laos presented a new challenge to US Forces in terms of the nature of the enemy, his tactics, the operational context, the US role in the Vietnam conflict, political and other constraints, and the environment itself. All of these were to influence the priorities attached to intelligence and intelligence collection requirements for these operations. The US air interdiction campaign against the North Vietnamese logistics system in the Steel Tiger area of the Laotian panhandle was selected for this case study. Specific operations studied include: Commando Hunt I, III, V and VII.

2. BACKGROUND

(C) The highways in Laos provided the principal lines of communication (LOCs) for the infiltration of personnel and supplies from North Vietnam to South Vietnam. There are no railroads. In October 1967, the earth surface non-improved motorable road network of more than 800 kilometers, 360 kilometers of which were open to traffic year round, was under communist control.[1] The inland waterway system, composed of the Mekong River and its tributaries offered a limited logistics capability. By 1969 Vehicular routes of travel into and out of Laos utilized five main passes, Nape, Mu Gia, Ban Karai, Ban Laboy, and Ban Raving, all located along the Laotian/Vietnamese border.

(C) The terrain in the NVN-Laos border region is extremely rugged and highly dissected. Dense undergrowth vegetation along the steep sloped mountains makes cross country movement extremely difficult to impassable for foot and vehicle movement except along the few trails and roads. Vehicles traveled mainly at night under the cover of canopy and darkness. During day dependence was placed on concealment within the nearly continuously tree canopied forest. However, small units could move along trails during the day with relative freedom while traveling in areas of dense undergrowth and dense tree canopy.[2]

2.1 Geographic Area

(C) The Steel Tiger area runs from the 20th parallel to the Cambodian border and includes the major infiltration routes of the Ho Chi Minh Trail. (See Figure 2.1)

(S) During the southwest monsoon season (May-September) heavy rains prevail with low visibilities and frequent thunderstorm activity throughout the mountainous areas. Floods occur and except for some roads and trails near the eastern border of Laos, the area becomes virtually impassable to vehicular traffic. The northeast monsoon season—dry season—(October-April) is characterized by a drying out, essentially clear weather, and very good conditions for enemy vehicular movements and air interdiction operations. The terrain runs from rugged to extremely rugged and highly dissected with steep sloped mountains covered by dense undergrowth vegetation. Nearly continuous two and three canopied forests lie adjacent to the roads. River and stream fords are usable during the dry season. Cave areas abound for additional cover, protection and storage. Major vehicular Laos entry and exit is through steep easily defended mountain passes generally located along the border. Ruggedness of the terrain and US interdiction activities have been estimated to restrict ground movement as follows:

> 2½ ton truck 8-4 km/hr; foot travel on roads
> 2 - 3.5 km/hr; foot travel on trails, 1-1.5 km/hr;
> and cross country travel 0.2 to 0.5 km/hr.[2]

2.2 Military Importance of Steel Tiger Area

(S) By 1967 the North Vietnamese, Pathet Lao and Viet Cong were in complete control of the Steel Tiger area. A complex route structure of roads and trails had been developed southward from Mu Gia Pass and most of the enemy personnel and supplies were now flowing southward through this network. The network included truck parks, transportation headquarters sites, base camps, supply centers and transfer points, bivouac sites and commo/liaison stations.

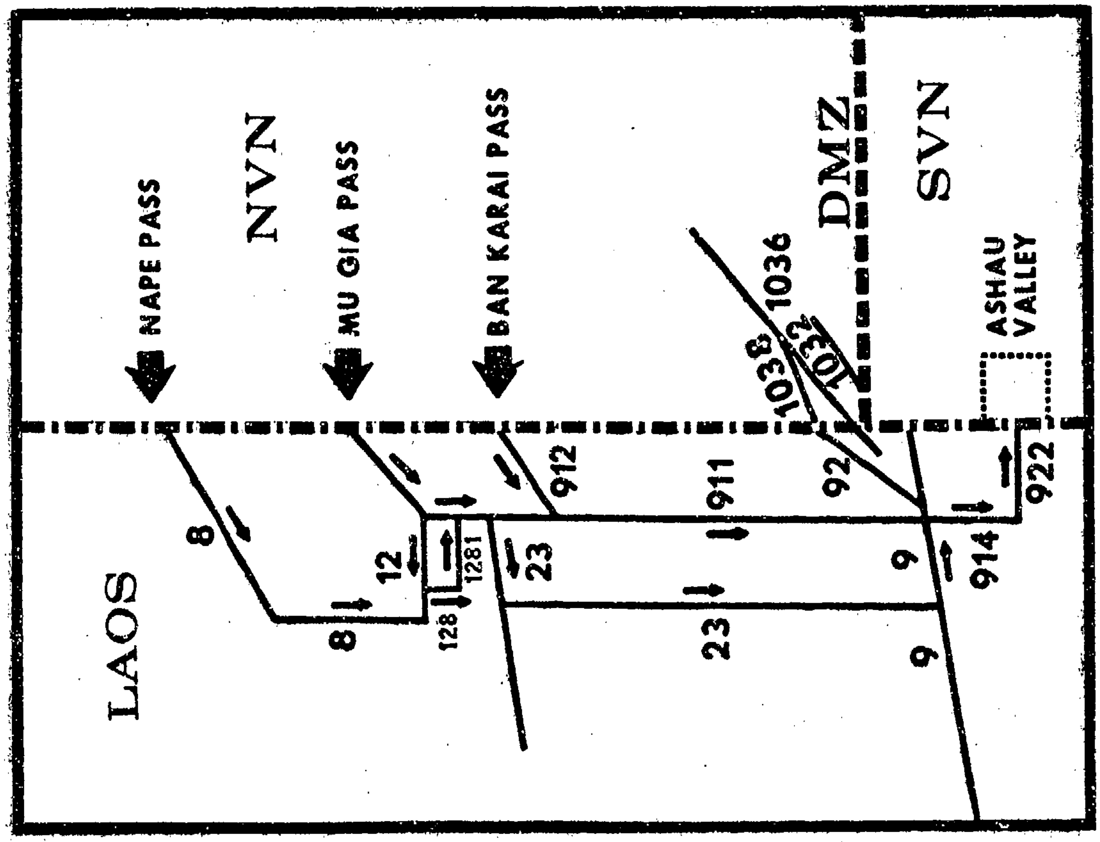
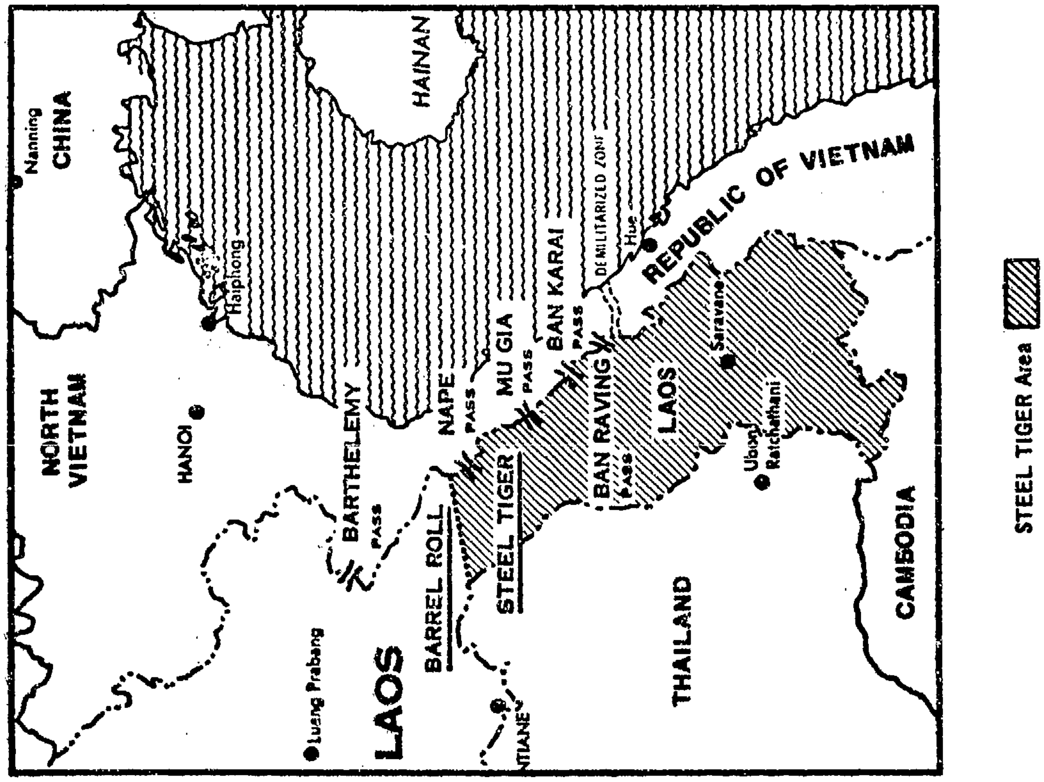


Fig. 2.1 (U)—STEEL TIGER Primary Route Structure with Route Numbers and Flow Directions



(S) Enemy activity had significantly increased in 1967 despite heavy US interdiction operations. During October-December 1967, for example, truck sightings to interdiction strike sorties was a ratio of approximately 1:1 as opposed to a ratio for the same period in 1966 of approximately 1:7.[3*] The tonnage input into the Republic of Vietnam, via the Ho Chi Minh Trail in Laos, was estimated by Seventh Air Force at over 300 tons per day during the peak traffic of the 1967/68 dry season. This figure compares with the often-quoted US Intelligence estimate in late 1965 of only 300 tons per month.[4] North Vietnamese recognition of the Ho Chi Minh Trail as the life line to their South Vietnam operations was also evidenced by their continually expanding defense efforts, the movement of air defense positions farther and farther southward along the trail, and the establishment of high-density defenses near pass areas and choke points. By 1967 it was estimated that the North Vietnamese employed 15-20,000 laborers in the maintenance, construction (or re-construction), and improvement of roads.[5]

2.3 Political Situation

(S) Politically, the North Vietnamese controlled the Steel Tiger area. By 1967 most of the area was considered an open bombing area; there were still many villages and "safe" areas which could not be attacked by US strike aircraft, however, Technically, the US Ambassador in Vientiane approved all interdiction strikes in Laos. Placement of sensors required personal approval of the Ambassador as did all Arc Light strikes. Farther west in Laos, the populace was less directly under North Vietnames and Pathet Lao control. The Royal Lao exercised political control over most of the Northwest (around Vientiane) in the areas adjacent to the Mekong River. The Pathet Lao, especially during the dry season, virtually controlled all other areas not directly under military control of the North Vietnamese.

2.4 Forces Involved

(S) US Forces. The US forces primarily involved in the Air Interdiction consisted of the USAF Tactical Air Forces. They were supported by

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*These ratios are as reported by DIA for truck sightings and the COMBA file for strike sorties within the Steel Tiger area. Available data fail to distinguish attack sorties against trucks from other attack sorties. Factors affecting the increase of sightings in Oct-Dec 1967 (11,205 vs 848 during the same period in 1966) include: the increased number of FAC and strike sorties; wider use of night observation devices; and more trucks on the road after a short 1967 rainy season.

Naval Tactical Air Units from carriers stationed in the Gulf of Tonkin. During later stages of the Commando Hunt operations, the interdiction effort was augmented by B-52 Arc Light strikes. The Air Interdiction campaign was under the operational control of MACV and 7th Air Force with out-country resources under the administrative command of the 7th/13th AF Headquarters at UDORN RTAFB Thailand. Special Operations Group (SOG) resources were utilized as feasible and required. Road Watch teams were provided and utilized for trail and area surveillance. Area and real time intelligence was provided under the direction and management of MACV and 7th Air Force. This support included SIGINT and COMINT.

(S) Bomb damage assessments were made from strike crew reports, air controller reports and confirmations, airborne reconnaissance photography, unattended ground sensor intelligence, road watch team reports, recovered enemy documents and prisoner interrogations. Several methods were developed for evaluating bomb damage in terms of tonnage destroyed. These were based on the observation of fires, trucks destroyed and secondary explosions observed. Accurate BDA was difficult because of the inability to perform ground surveys and damage assessments after strike operations. Hand-held black and white photography collected by the forward air controller and strike photography, from camera-equipped strike aircraft, were also extensively used for BDA.

(S) Enemy Forces Involved. Enemy forces included: personnel manning for all storage, transfer, movement and resupply along the Ho Chi Minh trail, along with appropriate Headquarters staffing and communications units; 15-20,000 laborers assigned for maintenance, construction, and improvement of roads;[5] air defense units equippped with AAA and SAM weaponry; and local security forces. Primary modes of transportation were: trucks, bicycles, sampans and manpack.

2.5 Types of Operations

(S) Nature and Character of US Operations. US Interdiction Operations included:

a. Tactical Strike Operations - Against both stationary and moving enemy targets using propeller and jet tactical strike aircraft.

b. Heavy Bombardment - Against stationary targets such as storage depots, truck parks, ammunition dumps, fuel dumps, choke points and passes.

c. Gunship Operations - Against moving targets, and other sensor locatable targets.

d. Forward Air Control Operations - Airborne forward air controllers were used in the role of target detection, identification and designation; strike direction; and intelligence collection, including bomb damage assessment.

e. ABCCC Operations - Command and Control of Air Interdiction was generally under the Air Battle control of the Airborne Battlefield Command and Control Center.

f. Defense Suppression - Defense suppression was accomplished by a combination of electronic warfare (EW) and direct strikes against defense positions and radars of AAA and SAMs.

g. Sensor Operations - Unattended ground sensors were air emplaced along roads and trails and in the vicinity of truck parks and storage areas. Enemy movements and activities were electronically monitored with the information transmitted to Task Force Alpha at NKP RTAFB Thailand, or to an airborne analysis center, for evaluation analysis and interdiction target development.

h. Other Sensor Operations - SLAR and FLIR equipped reconnaissance aircraft and/or gunships equipped with such equipment were utilized for target detection and location and intelligence gathering.

i. Photo Reconnaissance - Photo reconnaissance was provided by a dedicated reconnaissance wing and provided photographic coverage for sensor emplacement planning, air surveillance, mapping, target location, LOC analysis, camouflage detection, and battle damage assessment. Combat feasibility tests were also conducted using other specific purpose sensors such as ignition detectors.

j. Special Operations Group (SOG) - SOG operations for ground based area surveillance, target location and battle damage assessments, were used as the ground threat environment permitted, and as required for high priority intelligence requirements.

k. Road Watch Operations - Road watch operations consisted of the infiltration of special watch teams by air or ground with ultimate locations of operations at critical and key observation points where logistics and personnel flows could be monitored. Intelligence gathered by this means was used for interdiction campaign planning.

l. Rescue Operations - Rescue operations were conducted for recovery of downed air crew members. Extraction and recovery was accomplished using rescue helicopters protected by defense suppression. Such combined operations involved rescue vehicles, forward air controllers, ABCCC, emergency communication equipment in the hands of the downed crew member, gunships and other defense suppression aircraft. Capabilities existed to rescue and recover from almost any point within the Steel Tiger area regardless of the nature of the threat environment.

(S) Nature and Character of Enemy Operations. The primary mission of enemy operations within the Steel Tiger area was to assure an adequate flow of men and war materiel through the Laotian panhandle into South Vietnam; to support the forces maintaining the Ho Chi Minh Trail; and to protect the LOC's and personnel. Primary operations included:

a. Movement of Men and Materiel - Methods of movement included trucks, sampans, bicycles, beasts of burden, manpack and on foot. Major movements were restricted to the dry monsoon period, October-May and along the road and trail network of the Ho Chi Minh Trail. Except for areas of heavy canopy and undergrowth where movement could be accomplished, unobserved during daylight hours, movement was accomplished during the hours of darkness.

b. Storage, Bivouac, Overnight Parking and Materiel Transfer - A highly complex system, well developed along the Ho Chi Minh Trail, provided for storage depots, personnel bivouac areas, truck parks for maintenance and overnight parking of vehicles, and for transferring materiel between road segments and between specific geographically assigned (generally road segment) truck units. Permanent locations were generally well hidden within caves, dugouts and/or well camouflaged. Critical points were well defended by air defense units.

c. Air Defense - The Enemy Air Defense was composed of SAMs, AAA, and small arms fire. In highly defended areas the fire was generally intense but not particularly effective. Introduction of radar controlled AAA and SAMs significantly increased the threat to air interdiction strike operations. Air defenses from 1966 onward were proliferated southward from the Mu Gia Pass and tended to deny many areas to slow moving forward air controller operations unless extensive air defense suppression was employed. The heavy enemy air defense also required development of new air interdiction strike tactics to include additional sorties for defense suppression cover.

d. Maintenance, Road Construction and Repair - Enemy activities were continuous with respect to road improvements, road and trail maintenance and repair, road clearing after strikes, ford development and camouflage. Most work was accomplished by manual labor, however, heavy equipment, in limited numbers, especially bulldozers, was also utilized. Road repair and clearing operations, generally accomplished during daylight hours, appeared rapid and satisfactory. Although maintenance and repair crews were especially vulnerable to daylight air interdiction operations, the terrain provided excellent cover and protection for the interruptions incurred by strike operations. It was estimated that in 1967, 15-20,000 laborers were employed along the Ho Chi Minh trail for maintenance, road repair and road construction.[5]

e. Command, Control and Communications - The enemy maintained a surprisingly (apparently) effective command, control and communications network along the Ho Chi Minh trail. Headquarters and Signal units were located at optimum points along the trail and were well camouflaged and protected. It appeared that many were quite mobile and could move their location (short distances) as required to avoid detection and strike. The system also served for intelligence reporting and early strike warning. There is no doubt but that the C^3 operations were in direct and real time communication with Hanoi.

f. Countermeasures - Although there was no direct evidence of enemy electronic countermeasures - with the exception of normally expected communications security procedures and defense radar operations, activities of a more passive nature were observed. These included search and destruction of unattended ground sensors, establishing temporary truck park areas where trucks could be routed off the roads into camouflaged or densely canopied areas until cessation of strike activities, use of dummies, and extensive camouflage of trails and roads. Bridges were built beneath the water surface, at river and stream crossing points, so they could not be easily detected and destroyed.

3. INTERDICTION OPERATIONS PRIOR TO COMMANDO HUNT

(U) This section outlines the growth of US capabilities for air interdiction chronologically with the growth of North Vietnamese activities in Laos. Certain milestones in intelligence operations in support of air interdiction are noted and correlated with developments in the chronology of the US interdiction efforts in the Steel Tiger area of Laos.

3.1 NVA Activities in Laos

(U) The estimated number of North Vietnamese military who remained in Laos after the final date for the Geneva Accords withdrawal was 6-7000.[6] The North Vietnamese forces were concealed for the most part in small cantonments in Pathet Lao held territory.[11] Hanoi maintained radio contact with, and control over, both these forces and the Pathet Lao. During the remainder of 1962 and through 1963, work continued in maintaining and developing LOCs, storage areas and supply points in support of both Laos and South Vietnam insurgency activities. No attempts were made to camouflage ongoing activities.

(U) In 1964 North Vietnam markedly increased its use of the Ho Chi Minh trail for infiltration of supplies and personnel into South Vietnam (SVN) and Laos. The Royal Laotian Air Force (RLAF) was conducting air operations against the trail with aircraft flying out of Savannkhet but in the face of the added threat, the Royal Laotian Government (RLG) requested further assistance.[7] American ground controllers supported these air operations in Laos through the fall of 1964.

(U) As the result of initial air operations against the trail, the North Vietnamese started camouflaging their activities and shifted a higher percentage of supply movements away from the road system into the jungle along canopied roadways and jungle trails. As a matter of interest, intelligence had already noted that the North Vietnamese and Pathet Lao were already able to anticipate strike activities and take measures for protection.[7]

(C) By 1965, the number of North Vietnamese military personnel in Laos was estimated to have reached 15,000.[10] Development of the trail network continued. The extensive camouflage activities initiated in 1964 were expanded to include trellises over stretches of roads not hidden by natural jungle canopy, and the use of underwater bridges.[8]

(S) By 1966, the Ho Chi Minh road and trail network was estimated to have a capacity of 300 tons/day.[9]

3.2 Early US Air Activities in Laos and Thailand

(S) When communist troops captured the Plain of Jars in Northeastern Laos during May 1964, the Royal Thai Government (RTG) agreed to the use of Thai bases for US photo reconnaissance flights and search and rescue missions over Laos. As early as March 1964, six F-10C's were stationed at Takhli RTAFB. On 19 May 1964 the first US reconnaissance flight was flown over the southern portion of Laos. A month later, an agreement was reached to allow armed escort of both.[1] In August 1964, after the Gulf of Tonkin incident, twelve more F-100's were moved to Takhli and a squadron of F-105's was deployed to Korat RTAFB. In November an F-105 squadron replaced the F-100's at Takhli. The year 1964 ended with about 3000 Air Force personnel in Thailand supporting an air fleet of approximately 75 aircraft, including rescue helicopters.[6]

(U) In January 1965, the US requested of the RLG that bombing of the Ho Chi Minh trail be instituted. The Lao agreed, but with restrictions placed upon strikes that would go into populated areas or areas in which they had personnel of their own operating on the ground.

(U) In early 1965 the United States began bombing of Lao territory along the Ho Chi Minh trail.[7]

(U) Primary US responsibility for close air support to the RLG in Laos, and interdiction operations, was assigned to the 56th Air Commando Wing, later designated the 56th Special Operations Wing, located at Nakhon Phanom RTAFB. This Wing was, by 1968, composed of six different squadrons. Basically, all the aircraft were propeller type "slow movers" including A-1E's, A-26s, O-1s, O-2s, C-123s, U-19s, OV-10s and helicopters. The Wing mission was a combination of strike, reconnaissance, forward air controllers, flare ship operations, psychological warfare, and search and rescue.[6]

(U) Also by 1965 Thailand had agreed to use of RTAF bases by US forces for air operations in Vietnam and in early 1965, the US began bombing North Vietnam. As a consequence, additional strike aircraft were deployed to Thailand. The F-105 squadron at Takhli RTAFB was augmented to become the 355th Tactical Fighter Wing composed now of three F-105 squadrons. In August 1965, two EB-66 squadrons were assigned to Takhli with a mission of electronic warfare jamming, electronic intelligence and SAM warning detection.[6] By the end of 1965 there were over 9,000 USAF personnel and about 200 aircraft stationed in Thailand.[10]

(U) The year 1966 was the year of greatest US Air Force expansion in Thailand. Additional deployments included: the 606th Air Commando Squadron; in April, the 388th TFW was reactivated at Korat RTAFB with three F-105 squadrons; in September, the 432nd Tactical Reconnaissance Wing was organized at UDORN. The 432nd Wing consisted of the 11th and 20th Tactical Reconnaissance Squadrons (TRS) flying RF-4C's and RF-101's; and additional tanker and support aircraft. By December 1966 the US Air Force in Thailand numbered about 25,000 and the aircraft inventory about 400.[6]

3.3 Interdiction Operations (1966-1968)

(C) Although the southwest monsoon season extended on into November in 1966, during the period of October-December, 848 trucks were sighted along the LOCs and 6680 attack sorties resulted in 28 trucks destroyed per 1000 sorties.[3] It should be noted that many sorties did not attack trucks but attacked storage and supply locations, choke points and other targets. The antiaircraft threat along the trail, although not yet great enough to create an unacceptable risk to the slow moving aircraft (A-1s, B-26s) flying interdiction sorties along the trail, was noted to be increasing. Nineteen AAA firings per 1000 sorties were observed and reported.[10]

(S) By mid-December 1967 the Igloo White program was in operation as an anti-vehicular activity within the Steel Tiger area of the Ho Chi Minh trail. Sensors were emplaced by air and signals from the sensors readout by EC-121 aircraft flying in orbits over Laos (three squadrons of EC-121 aircraft were located at Korat RTAFB). Data was transmitted to Task Force Alpha at the Nakhon Phanom Air Base where target information for interdiction was developed and reported to 7th Air Force and to the ABCCC for near real time strikes against trucks either moving or parked along the Ho Chi Minh Trail.* Although the sensor system was a 24-hour all-weather operation, strikes were still limited against detected targets (except for some "Sky-Spot" radar directed strikes) because the rules of engagement required forward air control aircraft to re-locate, identify, and direct strike aircraft against the TFA developed targets.

(C) As indicated earlier, enemy activity along the Ho Chi Minh trail increased significantly in 1967 despite heavy US interdiction operations.

(S) It was estimated in 1967 that the North Vietnamese now employed 15,000-20,000 laborers in the maintenance, construction and improvement of the road network in Laos.[5] In October-December, US pilots sighted over 11,000 trucks in the Steel Tiger area—more than 13 times the number sighted during the same period in 1966. During the 4th quarter 1967, 11,405 attack sorties were flown in the Steel Tiger area—nearly twice the number flown in the same period of 1966. The number of FAC sorties also increased proportionately. Night Observation Devices (NODs) were also introduced and significantly enhanced night detection capabilities for trucks. Trucks destroyed during this period was at a ratio of 115 per 1000 sorties, a factor of almost four higher than the same period of 1966.** During the first ten months of 1967, AAA firings in Laos were reported at 74 per 1000 sorties which represents almost an increase of three times that observed in 1966.[10]

(C) At this point it was being estimated that an inventory of 300-400 trucks were permanently stationed within the Steel Tiger area and approximately 300 more were being used to shuttle materiel into Laos from North Vietnam. Subsequent intelligence indicates these figures were probably low.

(S) In January 1968, truck sightings along the trail network reached a peak of 6200. During the first ten days in February, road watch teams reported 500 trucks southbound through the Mu Gia pass.[3] During the first

*See Appendix D for discussion of TFA mission and activities.

**This was due in part to the fact that the trail roads were dry by October in 1967, almost a month earlier than in 1966.[3]

quarter of 1968 it was estimated short tons entering Laos per day were almost double that of first quarter 1967 and personnel infiltration was estimated to be over twice that in 1967.[4]

(U) On 31 March 1968, there was a partial bombing halt in North Vietnam. This was made a full bombing halt on 1 November 1968.[6]

(S) Prior to the bombing restriction in North Vietnam, that area received the primary thrust of air combat operations for tactical aircraft stationed both in SVN and Thailand. Laos generally got what was left over (except for the capabilities of the 56th SOW at NKPRTAFB) and a limited number of jet strike aircraft sorties available for Muscle Shoals anti-vehicular activities). Because of the emphasis on North Vietnam, a large percentage of the jet sorties made available for Laos were weather diverts from primary and secondary target assignments with minimum time over target for Laotian targets. (This was especially true of Navy jets.) This presented a real problem for finding lucrative targets which could be assigned, then matching a forward controller, and getting him in place for strike direction. Often strike aircraft arrived with the wrong ordnance and were used against the wrong targets.[7]

(S) Interdiction efforts in Laos increased dramatically with the cessation of strikes in North Vietnam. Large numbers of jet sorties were shifted to interdiction missions in the Laotian panhandle.[4] As a result, the available strike aircraft completely overloaded the FAC capability. Strike aircraft were forced to remain in orbit long periods of time which tended to reduce the available time over target if and when they were matched with an FAC. Eventually, strike aircraft were allowed to operate without separate FACs in the eastern Laotian panhandle.

(S) On 12 November 1968, the 25th Tactical Fighter Squadron, 8th TFW made the first air delivered ground sensor drop relying solely on LORAN. On the same date, the 8th TFW flew its first WOLF FAC sorties with F-4s to collect intelligence by visual reconnaissance means and to call in air strikes. These changes in operations were necessitated by the growing intensity of the SAM and AAA threat within the Steel Tiger area of operations and inability of slow moving FACs to be effective and survive.[11]

(S) Although there were 67,000 sorties flown in 1968, one general conclusion[15] describes the interdiction campaign in those months (up to April 1968) as constrained not by lack of targets, but by an inability to destroy them.[12] FACs were able to identify a surplus of trucks in good weather. The Igloo White operations could identify targets during bad weather, yet this real time intelligence was of little value because of a limited ability to attack during bad weather.

(C) In late 1968, the Pave Nail (laser-designator equipped) OV-10A was introduced into Southeast Asia, but was soon found to have a limited night operating capability. The hand held starlight scope could not be used because of cockpit glow on the windows and the fact that the windows in the OV-10A could not be opened in flight, as could those of the O-2A.[13]

(S) Against this backdrop of activities through the middle of 1968, planning efforts were begun in July for the 1968 northeast monsoon (dry season) interdiction campaign in Laos. The 1968 campaign, designated Commando Hunt I began on 15 November 1968.

4. COMMANDO HUNT OPERATIONS - 1968 - APRIL 1972

4.1 General

(S) Interdiction of the overland flow of supplies for North Vietnam to the Viet Cong and North Vietnamese forces in South Vietnam, Laos and Cambodia was a primary mission for American airpower in Southeast Asia. Before the cessation of bombing of North Vietnam on 1 November 1968, the primary target for air interdiction was the supply system in North Vietnam. With the bombing halt, the emphasis shifted to the logistics channel the North Vietnamese maintained in southern Laos. These interdiction campaigns in southern Laos, the Steel Tiger area of operations, bear the name

Commando Hunt with numerical designations that changed with the semi-annual monsoonal shift.[14]

(S) In any fluid tactical environment, and even more in interdiction operations than when supporting troops in contact, the tactical air commander must be supplied continually with accurate and timely air intelligence if he is to employ his forces effectively. Raw intelligence must be gathered from all relevant sources and quickly communicated to a central point which is controlling the air interdiction campaign. The "central point" may actually be one of a series of "points" depending upon the role each point plays in the campaign. For campaign planning normally the Headquarters "point" will be focal. For implementation and conduct of the campaign certain intelligence must be "real time" and "near real time" and communicated directly to the combat operational focal points, e.g., tactical strike units; airborne command and control elements; and intermediate Tactical Air Control Centers (including FACs). All sources of intelligence must be fused, regardless of sensitivity, into an operationally useful product. In interdiction, intelligence is concerned primarily with determining what the enemy is storing and moving (including personnel), how and where he is moving it, what his time and place logistics objectives are, and, in the case of Southeast Asia, how these objectives relate to the ground campaigns in the Republic of Vietnam, Laos and Cambodia, and what the specific results of interdiction efforts have been on his logistic system, its elements and capabilities. From such intelligence the tactical air commander and his staff will understand and know the location of targets and be able to assess their worth. He can pinpoint enemy air defenses and plan his interdiction campaign to include suppression or avoidance, thereby minimizing his losses. Good battle damage assessment will provide him a yardstick by which he can measure his effectiveness and the cost inflicted upon the enemy.[15]

(S) The Commando Hunt interdiction campaign was no doubt the most integrated intelligence/combat operations effort during the entire war in Southeast Asia. During the course of the campaign new approaches were developed for intelligence gathering and disseminating as well as new tactics for interdiction strike operations. The Igloo White system was utilized to its maximum capacity for providing intelligence from unattended ground sensors. The concept of using Task Force Alpha as a consolidated real time intelligence/strike control organization was explored. New airborne sensors were tested for gathering intelligence and for locating targets exactly so strike aircraft could be directed against them. ELINT and ARDF intelligence was utilized in near real time and, in many cases, in real time during actual interdiction operations. New methods were utilized for gathering bomb damage assessments, e.g., acoustic sensors.

(U) This section will attempt to provide an overview of four of the Commando Hunt Operations (I, III, V and VII) which were primarily concerned with "dry seasons" within the Steel Tiger area of interdiction operations in the panhandle of Laos (Ho Chi Minh Trail). See Figure 2.1.

4.2 Commando Hunt I

(S) In mid-1968, Seventh Air Force strategists made plans for the coming dry season in Laos. Several considerations influenced this planning; the political and military necessity of disrupting "another" Tet Offensive, the need to explore the use of Igloo White, and the advantage of exploiting the experience gained from previous years in both the Route Package I (NVN) and Steel Tiger (Laos) areas of interdiction operations. The criticality of the situation was reflected in several relaxations of rules of engagement during the campaign. Dropped were the 4500 feet minimum altitude for bombing and the requirement for FAC control in two zones of operation. Also the number of Arc Light operating areas was greatly expanded, thus reducing B-52 coordination times. The campaign concentrated on the region between the Mu Gia Pass and the town of Tchepone in Laos (see Figure 2.1). Task Force Alpha (then called Sycamore) was assigned operational control of Commando Hunt.[15]

(S) The primary objectives of Commando Hunt I were to: (1) reduce the logistical flow by substantially increasing the time required for the enemy to transmit supplies into Vietnam; and (2) destroy enemy trucks and caches of military supplies along the routes leading into South Vietnam. Throughout the campaign, the strategy was to vary force allocation and targeting in dynamic interaction with the enemy to inflict maximum destruction on his logistics pipeline through Laos.[16]

(S) A Combat Operations Center (COC) was established at Task Force Alpha. A certain number of aircraft sorties were allocated each day for TFA to use as it saw fit. TFA determined targets and their priority. It also provided other intelligence information and exercised operational direction through Sycamore control. TFA also had a certain number of forward air control (FAC) sorties allocated daily to control the strikes.[18]

(S) TFA also monitored and interpreted the Igloo White sensors. These sensors—seismic and acoustic—were implanted along LOCs, suspected truck parks, and other areas of personnel or equipment concentration. The objective was to monitor moving traffic and to confirm the location of suspected logistic areas. The data derived from the sensors were used as real time tactical information to intercept truck convoys and as non-real time intelligence to improve storage area targeting, locate bypasses, and measure traffic throughput. Sensor derived information also aided in locating troop concentrations and in checking the efficiency of air tactics. The establishment of TFA as a Combat Operations Center and the integrated use of intelligence derived from the Igloo White system were milestones. Real time intelligence could be provided to FACs, strike aircraft, and gunships as the circumstances warranted. Igloo White directly assisted in the real time location of slightly more than 20 percent of the targets attacked. Nearly all the targeting of LOCs, about 38 percent of the truck parks, and 15 percent of the trucks struck were located by using Igloo White inputs. Sensor readouts were also used to evaluate the success of interdiction efforts.[16]

(S) Task Force Alpha and the Igloo White system, although of great value and high importance in Commando Hunt I, do not represent the total effort by any means. The 7th Air Force continued to control many of the strike sorties bound for the Steel Tiger area. These aircraft were equipped with specific ordnance to strike certain kinds of targets as developed by 7th Air Force target planners.[16] Photography continued to play a significant role in support of Commando Hunt. For example, photo recce aircraft were able to provide information on the amount of materiel and trucks arriving in the ports of North Vietnam as an indication of what could be expected to appear along the Ho Chi Minh trail. Armed photo recce, weather permitting, patrolled the area east of Mu Gia Pass and was able to alert planners and strike operators as to current buildups of men, materiel and trucks about to enter the logistics network of Laos. The EB-66 aircraft gathered electronic intelligence on the Laotian AAOB and SAMs as well as providing warning and jamming support services to strike aircraft and B-52s. The forward air controller (FACs) were indispensable for daytime and night visual surveillance and target detection. Use of the starlight scope by the FAC aircraft significantly enhanced visual observations during low visibility and on starlight and moonlight nights. The preponderance of the battle damage assessment intelligence was provided by photography and FAC and strike crew reports. ARDF SIGINT information was high value intelligence which was integrated into targeting against semi-permanent and stationary interdiction targets. Other activities such as Road Watch teams, POW interrogation reports, etc., also played roles in the effectiveness of Commando Hunt.

(S) In order to place Commando Hunt I in perspective with the past, and to establish a basis for comparison with subsequent Commando Hunt operations considered in this report, the following operational statistics are provided. Period covered is November 1968 - April 1969, area Steel Tiger. (Data are to be used for trend indications rather than for exact numbers due to some discrepancies between sources of data used.) Primary source was reference 17.

Trucks Sighted[a/]	Attack Sorties[b/]	Trucks Dest./Dam.	Secondary Explosions & Fires[c/]	Acft Lost[d/]	NVN AAOB(Laos)[e/]
49,000	72,258	6,108	44,205	70	100-319

a/ Does not necessarily indicate 49,000 individual trucks since the same truck may have been sighted more than once or counted by more than one means.

b/ This total includes AF, Navy, and Marine sorties. B-52 sorties are not included.

c/ Does not include B-52 BDA.

d/ USAF losses only.

e/ AAA areas of 3-5 weapons each.

(S) Aircraft attack sorties in 1968 increased 64 percent over those in 1967 with the heaviest increases per month during November and December. The fighter/attack aircraft losses per 1000 sorties for 1967 were 0.7; for 1968 overall 0.6; and for the first two months of Commando Hunt I (November-December 1968) was 0.5. The total attack sorties for 1967 (Laos) were slightly over 44,000.[4]

(S) Despite the great increase in attack sorties and the fact that the number of truck sightings in November 1968 was approximately the same as the number for November 1967, only 37 percent as many were destroyed (680 - November 1967 and 249 - November 1968). Results in December returned to normal.[4] The following few months (January-April 1969) trucks destroyed or damaged averaged almost 1200 per month with very significant increases throughout Commando Hunt I in secondary explosions and fires recorded: Dec 68 - 2420; Jan 69 - 4975; Feb 69 - 9000; Mar 69 - 12,250; Apr 69 - 13,500.[17]

(S) By the end of Commando Hunt I, 7th AF Headquarters had assembled a detailed picture of enemy operations in the Laotian panhandle. Sensors had proven most valuable in reporting general traffic trends and in locating truck parks and storage areas. It was also found that sensors could "watch" less traveled roads and free the FACs for more lucrative areas. The sensors could monitor above and below a closed choke point and indicate probable use of bypasses. In addition to monitoring sensor intelligence Task Force Alpha demonstrated the effective use of all source intelligence analysis.

In at least one case a TFA study group correlated two years of historical data to locate likely truck parks, storage areas, and maintenance facilities. Potential locations were plotted with relation to current photo, sensor and topographical data.[15] Results of such studies were programmed into strike planning, especially for B-52 strike operations.

(S) Commando Hunt I was the most intensified integrated air interdiction campaign ever to be mounted in the Vietnam conflict. Integrated pressure was applied against four enemy target categories: (1) LOCs, (2) truck park/storage areas, (3) movers (trucks and bulldozers), and (4) antiaircraft weapons. Putting dedicated resources at the disposal of an intelligence exploitation center possessing targeting authority and an area of operation (or vice-versa, i.e., placing dedicated intelligence resources at the immediate disposal of combat operations) enhanced the flexibility and sustained response to enemy actions and reactions.

(S) The campaign stressed the interrelationship between the four target types. Attacking trucks would clog storage areas; attacking storage areas would force trucks into the open. The general degradation of the logistics system in the Mu Gia Pass area resulted in the necessity for building additional bypasses with time consuming delays and the further consumption of manpower and precious supplies to support construction maintenance and provide defense. Arc Light missions were considered primarily responsible for such debilitating impacts.[15]

4.3 Commando Hunt III

(S) During Commando Hunt I, the NVA was able to deliver to South Vietnam about 8500 tons of the 45,000 tons which entered Laos.[14] The difference of 36,500 tons represents tonnage used or stored in Laos plus tonnage believed destroyed. Precise estimates of the latter are, however, not available.* During Commando Hunt III, operational

*The important value is the estimated 8500 tons of throughput and its use as a comparison factor for Commando Hunt operations effectiveness in slowing the input of supplies into South Vietnam. See Section 4.7 for logistics input/throughput comparisons.

control of Commando Hunt was transferred back to 7th Air Force from Task Force Alpha in April 1969. Although considered a successful demonstration of the integrated concept, it was decided that control by 7th AF COC and the ABCCC would be equally as effective. ring the wet season plans were made to expand and modify the sensor fields to cover a larger area—from Northern Laos (Barrel Roll) through Steel Tiger South, but with fewer sensors. The period of summer 1969 was also a period of testing new procedures and developing new sensor applications.[16]

(S) The 7th AF Operations Plan for Commando Hunt III pictured the Igloo White system as an integral real time part of the interdiction campaign. Emphasis was placed on improved detection and analysis reliability, capability, and confidence. Also included in the plan was the concept of using sensor information to vector aircraft for LORAN strikes. Special sensor emplacements were to be made at entry and exit points and along the LOCs. Sensors were programmed for "reconnaissance by acoustics"—the emplacement of acoustic sensors in specified areas of enemy activity in an effort to determine the type of activity taking place. A new operation called Commando Bolt was established in November 1969. This combined operation integrated sensor data with FAC and strike aircraft intercepts at predetermined intercept points designated Desired Mean Points of Impact (DMPI). A significant feature of this operation was the Sparky FAC which detected, and calculated arrival times of trucks for the DMPI.[16] (For additional details on the specifics of the Task Force Alpha Commando Bolt activity the reader is referred to reference 16.)

(S) During this period C-130 aircraft were equipped for evaluation purposes with a new innovation—a sensor system to detect trucks by the electromagnetic noise emitted by their ignition systems. This sensor system was designated Black Crow.[17]

(S) Road work and materiel shipments began earlier in 1969—before the end of the wet season, and intensified after the rains slackened. Truck activity reached new heights in January and February 1970 as did the efficiency of the truck-killing force employed during Commando Hunt III.[14]

(S) Statistics concerning the Laotian interdiction campaign during the period of Commando Hunt III are provided below:[18]

Trucks Sighted[a/]	Attack Sorties[b/]	Trucks Dest./Dam.	Secondary Explosions & Fires[c/]	Acft Lost[d/]	NVN AAOB(Laos)[e/]
43,426	54,930	9,845	41,470	44	209-297

[a/] See note a/ for similar data on Commando Hunt I.

[b/] See note b/ for similar data on Commando Hunt I.

[c/] See note c/ for similar data on Commando Hunt I. B-52 sorties not included.

[d/] USAF losses only.

[e/] AAA areas of 3-5 weapons each.

(S) In comparison with Commando Hunt I data, during Commando Hunt III, truck sightings were down about 5500. However, the rate and number of attack sorties were significantly lower—the total for Commando Hunt III being about 65 percent of the Commando Hunt I number. On the other hand the number of trucks destroyed or damaged increased about 61 percent. Aircraft lost per 1000 sorties remained about the same. Secondary explosions and fires ran within 10 percent of those observed during Commando Hunt I. Battle damage assessments (BDA) may have been much higher than those recorded since a primary problem during Commando Hunt III, and especially for LORAN bombing, BDA was difficult to obtain. For example, as of 14 January 1970 only 36 percent of the BDA for LORAN strikes (LORAN equipped strike aircraft) had been obtained. Photo reconnaissance was subsequently able to gather BDA, however, for some strikes. For example, on the night of 11 January 1970 when weather precluded accurate BDA assessments by the FACs and strike aircraft, the reported results of 23 attacks were four fires and one AAA silenced. Subsequent photo reconnaissance indicated that 19 trucks had also been destroyed.[16]

(S) Overall, considering the significantly reduced number of attack sorties, the effectiveness of Commando Hunt III can generally be assessed in terms of the BDA reported, as about 2.5 times that of Commando Hunt I in trucks killed or damaged per sortie, and about 1.3 times that of Commando Hunt I for secondary fires and explosions. This improvement in effectiveness was accomplished with essentially no increase in a strike aircraft loss rate over that experienced during Commando Hunt I.

(S) Much of the increased efficiency during Commando Hunt III can be related to increased gunship operations and the use of airborne sensors, increased use of more accurate LORAN strikes, and the increased utilization of paveway munitions in conjunction with laser designators. For example as of the end of January 1970, 800 night laser releases had been made. Of these 442 (55 percent) were direct hits including the destruction of 13 bulldozers and 114 guns, plus numerous road and ford cuts.[19]

(S) Despite the successes of Commando Hunt III it was estimated that the NVA logistics effort resulted in a larger supply flow through Laos during Commando Hunt III than during Commando Hunt I.[14] This conclusion appears contradictory to the reported data on truck movements and BDA and may be based on the fact that methodologies for computing tonnage throughput had been refined, more data was being collected and analyzed—and previous throughput estimates may have been significantly low. Another factor may have been the transfer of tonnages into South Vietnam which had already been accumulated along the southern part of the LOCs in Laos prior to Commando Hunt III. The latter appears reasonable for a major portion of the discrepancy.

4.4 Commando Hunt V

(S) During the 1970 wet season, prior to Commando Hunt V, the North Vietnamese elected to keep their construction battalions in Laos and continued to build and improve roads. New roads were under construction to bypass certain interdiction points which had suffered heavily under Commando Hunt III. Many NVA antiaircraft positions also remained in place. This wet season activity presaged an intensive resupply effort for the upcoming dry season. Supply shortages in South Vietnam, attributed to previous Commando Hunt campaigns and the capture and destruction of stores in Cambodia, appeared to result in reduced VC and NVA activities. Patterns of combat continued but on a smaller scale with a shift to smaller unit actions. The rate of fire attacks had decreased and intensities of attacks reduced to about two-thirds of what had previously been experienced.[14]

(S) Seventh Air Force Operation Plan 715, Commando Hunt V, was an integral part of the overall MACV effort in Southeast Asia and was corollary to plans for air operations in RVN and Cambodia. The plan allocated 70% of the available US fighter/attack sorties to Steel Tiger interdiction. The majority of AC-130 and AC-119K gunship sorties were also allocated to the same area. Just prior to the campaign, an addendum to the plan established a concentrated interdiction of entry routes from NVN into Steel Tiger to preempt an expected early North Vietnamese logistics surge. COMUSMACV approved this addendum and allocated most of the available (1000 per month) Arc Light sorties toward the entry interdiction effort. Commando Hunt V was thus designed to take the initiative early and maintain maximum pressure on the NVA logistics network in Laos.[14]

(U) The remainder of this section will only highlight the Commando Hunt V Steel Tiger activities. For a detailed, in-depth report on Commando Hunt V, one should read reference 14 in its entirety since other geographical areas were also involved in this campaign.

(S) Commando Hunt V was the first sustained, concentrated saturation bombing effort designed to delay and impede traffic flow in Steel Tiger. New aircraft configurations, especially on gunships, designed specifically for the night-time truck killing role had matured for full exploitation during Commando Hunt V.[14]

(S) Tactics utilized during this campaign were as follows: Arc Light strikes were to saturation bomb interdiction entry points and destroy the roads. Tactical air was to prevent repair activity and perform armed reconnaissance. Gunships were to take a leading role in night operations to destroy air defenses and trucks. The Igloo White sensor surveillance system, still considered the prime source of reliable data on enemy logistics movements, configured its sensor strings according to three functions: strike, intelligence, and reconnaissance-by-acoustics; with the latter a supplement to intelligence. New sensor string configurations were used depending upon the function to be performed (see details in reference 14). Photography was also used extensively for developing potentially lucrative areas for sensor emplacements in moderate or heavy canopy most likely to conceal enemy facilities.[14]

(S) At the beginning of Commando Hunt V there were no known SA-2 sites within Laos. It was anticipated, however, that the planned concentration of the interdiction effort, including use of a high number of Arc Light missions, would increase the potential for NVN movement of SAMs across the Laotian border. Therefore, a concentrated program of photo and visual reconnaissance and electronic intelligence was instituted to search for indications of SAM deployments to sites within the Steel Tiger area. This effort was, however, hampered by a number of factors. Bad weather conditions during the first weeks of Commando Hunt V prevented sustained photo coverage and left ELINT as the principal means for fixing locations. EB-66s were the primary vehicles for collecting ELINT on Sams; however, aircraft availability limited coverage by EB-66 to only about 8 out of 24 hours. The Air Force and Navy did develop a coordinated plan for some Naval support with EA 3B, EA-121, and EP-3B aircraft. A request for national resources to provide additional support was not honored because of worldwide force limitations. The first site was not found until 5 March 1971. Throughout Commando Hunt V, however, for protection of B-52 Arc Light aircraft, EB-66's jammed pertinent radar frequencies of radar-directed weapons, including the SA-2. Iron Hand F-105s also supported the B-52s.[14]

(S) For implementation of the concentrated interdiction against entry routes, target boxes were designated at or near the Mu Gia, Ban Karai, Ban Raving, and DMZ pass or "choke" points. As the campaign progressed, additional boxes were developed to cut bypasses or specific route segments outside the original boxes.

(S) Pertinent statistics concerning the conduct and results of the Commando Hunt V campaign are provided below.[20,21,22]

Trucks Sighted[a/]	Attack Sorties[b/]	Trucks Dest./Dam.	Secondary Explosions & Fires[c/]	Acft Lost[d/]	NVN AAOB(Laos)[e/]
42,478	53,628	20,556	72,210	20	150-200

[a/] See note a/ CH I

[b/] See note b/ CH I

[c/] See note c/ CH I

[d/] USAF losses only

[e/] AAA areas of 3-5 weapons each.

(S) Trucks sighted and attack sorties during Commando Hunt V varied only about 2% from Commando Hunt III. Significantly, however, the number of trucks destroyed or damaged more than doubled, and secondary explosions and fires increased by almost 75%. Despite the fact that the NVA had introduced SA-2 sites, in addition to their 20 mm, 37 mm, 57 mm, and 87 mm antiaircraft batteries, USAF aircraft losses per 1000 sorties were drastically reduced, being less than half the loss rate experienced in Commando Hunt I and Commando Hunt III. This reduction in loss rate is attributed to the emphasis which was placed, during Commando Hunt V, on the accurate location of antiaircraft sites and the defense suppression strikes by attack/fighters or gunships prior to or during specific interdiction operations. Arc Light missions were also targeted heavily against AAA areas.

(S) The increase in truck k[illegible]s during Commando Hunt V has been attributed primarily to gunship operations, working in conjunction with ground sensor reports, and using the new and improved airborne detection sensors with which they had been equipped (see Appendix D). The B-57 Tropic Moon was also credited with significant contributions to night truck killing and shared honors with the gunship as "truck killers" for night interdiction operations.

(S) Despite the increase of intensity in allied activities in Northern Laos (Barrel Roll) and the necessity to provide additional air interdiction support especially around the Plaines des Jars, Commando Hunt V appeared the most successful operation to date of the Steel Tiger air interdiction campaign.

(S) Commando Hunt V was also successful in support of Lam Son 719, the South Vietnamese incursion into Laos, 30 January - 24 March 1971. One of the greatest problems encountered during this support was the language problem. US FACs carried SVN observers, many of whom could only speak poor English. This problem degraded for a while the capability for effective direction of close air support strikes in response to SVN ground commander requests. After it was discovered that the SVN ground controllers could speak better English than the SVN airborne observers, US pilots actually took over the communications and coordination became much more effective.[23]

(S) During Lam Son 719, heavy reliance was also placed on the Igloo White sensors strings for intelligence concerning the impact of the ground interdiction operation upon the NVA logistics. Sensor data (intelligence) also played a significant role in the planning and conduct of the SVN withdrawal from Laos.[23]

(S) During the "hectic" days of SVN withdrawal, FACs, TACAIR, B-52s and sensors all played heavy roles in holding off or delaying the NVA until helicopters could get in and move SVN units to safety.[23] (Reference 23 provides in-depth details on the interdiction and close air support provided during Lam Son 719.)

4.5 Commando Hunt VII

(S) As in the previous wet season before Commando Hunt V, the NVA continued to repair the roads and expand the route structure in the Steel Tiger interdiction area. By November 1971, 400 miles of road had been added in Steel Tiger and Military Region (MR) 1 of RVN. The most aggressive effort, the attempt to complete a road in MR-1 through the DMZ to provide a direct route into A Shau Valley was thwarted by allied bombings and rains from the northeast monsoon.[24]

(S) The enemy was expected to follow a similar logistics program pattern as demonstrated during earlier campaigns, however, to exert extensive pressures in Northern Laos in the hopes of diverting allied interdiction activities from the Steel Tiger area. The North Vietnamese continued to upgrade their air defense system in Laos. The number of SAMs were being increased as well as being moved closer to allied operations. The Ban Karai Pass was expected to be the most heavily traveled input route since its terrain features made it the most impervious of all the passes to interdiction even with Arc Light strikes.[24]

(S) During Commando Hunt V a concept of Special Munitions Packages (SMP) was utilized effectively. This was the integrated use of heavy stores to close off roads and passes, and mines and anti-personnel weapons for preventing repair. Corollary to this, but a part of the concept, was the appropriate emplacement of sensors to determine the effectiveness of the SMP efforts. One new aspect was added during Commando Hunt VII. Dedicated strike forces (quick reaction) QRFs were assigned to assure a strike within 60 minutes in a seeded area where sensors detected activity.[24]

(S) As expected, the NVA did concentrate a lot of effort in Northern Laos (Barrel Roll). Early in Commando Hunt VII Task Force Alpha (TFA) was given operational control of interdiction activities in the northern sectors. Due to the additional workload involved, this assignment precluded continuous monitoring of the Igloo White system components being used in Steel Tiger. TFA continued night monitoring and 7th Air Force placed its reliance upon daytime FAC reports to indicate when the enemy had successfully breached or bypassed the blocking points, and to prescribe when the strikes should be made.[24]

(S) The operation and degree of success of each of the blocking points has been described in detail in reference 24. Many blocking points were quite successful. In the Tchepone area munitions packages were credited with occasionally delaying truck traffic for a week or more. Traffic was halted completely by 1 February 1972 on Route 99E in Southern

Laos after seven munitions packages were delivered over a 6-week period. Other routes were closed up to two or three days at a time.[24]

(S) Comparative data for Commando Hunt VII interdiction activities for the period of November 1971 through January 1972 are provided below:[22,25]

Trucks Sighted a/	Attack Sorties b/	Trucks Dest./Dam.	Secondary Explosions & Fires c/	Acft Lost d/	NVN AAOB(Laos) e/
10,653	16,964	5,721	18,385	7	NA

a/ See note a/ CH I
b/ See note b/ CH I
c/ See note c/ CH I
d/ USAF losses only
e/ AAA areas of 3-5 weapons each.

(S) It should be noted that the above data only represent the first three months of Commando Hunt VII, the period for which reliable data were available. In order to compare Commando Hunt VII with Commando Hunt V, the Commando Hunt V data were recomputed for the corresponding time period. The resulting comparison indicates the following: trucks sightings were down by 37%; attack sorties down by 31%; trucks destroyed or damaged increased by 14%; secondary explosions and fires decreased by 19%; and, aircraft losses per 1000 sorties increased about 70%. The data further indicate an increase, during Commando Hunt VII, in truck killing efficiency per sortie, of about 6[illegible]%.

(S) This comparison indicates that for corresponding time periods Commando Hunt VII appears to be the most efficient truck killing operation of the air interdiction campaign. Lessons learned during Commando Hunt operations I, III and V, both in intelligence and in target planning and strike operations, were applied effectively, and in coordination with new night interdiction airborne target detection and designation systems, to inflict maximum damage and logistical delay upon the enemy.

4.6 Night vs Day Interdiction Operations

(C) Although the Commando Hunt operations involved both day and night interdiction activities, it is important to note that there were significant differences in terms of intelligence support and combat operations during hours of darkness, as opposed to daylight. Of primary importance was the fact that more NVA logistics movement activity occurred at night. During daylight hours, however, air interdiction activities could be concentrated on stationary target areas and upon road construction and maintenance activities.

(S) Corollary to the above, air interdiction tactics were different for night strikes. Specialized aircraft such as gunships and the B-57 Tropic Moon were equipped with target detecting sensors for enhancement of night target location. Visual bomb damage assessments, weather conditions permitting, were generally more complete during darkness due to easier observation of fires and explosions. On the other hand, often BDA on trucks destroyed or damaged was more complete when daylight reconnaissance photography could be accomplished.

(S) Under the above circumstances it becomes difficult to make an effectiveness comparison between intelligence means which served similar functions but were restricted to either day or night use. The only 24-hour all-weather intelligence collecting system available was the Igloo White unattended ground sensors sytem. (See Appendix D for details on the Igloo White sensor system.)

(S) The subject of night versus day means for intelligence collection deserves a more in-depth study than is afforded by this Appendix. However, a quick look at the division of effort, in terms of night versus day strike/attack sorties in the Steel Tiger area does provide an indication of the magnitude of the problem both with respect to intelligence support and air operations.

	Steel Tiger Day Sorties	Steel Tiger Night Sorties
Commando Hunt I	46,679	25,579
Commando Hunt III	32,715	22,215
Commando Hunt V	30,807	22,821
Commando Hunt VII (3 months)	(10,638)	(6,326)

(U) The above data were accumulated from references 19, 21, 22, 23, 24 and 26. B-52 sorties are not included.

4.7 Logistics Input/Throughput

(U) One measure of effectiveness for the air interdiction of the NVA logistics network in the Steel Tiger area of Laos is the impact upon combat operations in South Vietnam. Since the Laotian road and trail network became the principal logistics route for entry of men, materiel and supplies into South Vietnam, a look at the results which can be attributed to the Commando Hunt operations provides an indirect trend type assessment, at least as to how difficult and costly it became for the North Vietnamese to support combat operations in South Vietnam. Again, indirectly, these results should reflect upon the effectiveness of tactical intelligence during the interdiction campaign.

(S) The following logistics input (from NVN into Laos) and throughput (from Laos into South Vietnam) data were gathered from USAF, Air Operations, Trends, Indicators and Analyses; and Air Operation Review; reports published during the period 1969-1972 for Commando Hunt III, V and VII, and from the PACAF Commando Hunt V report for Commando Hunt I. Periods are November thru April for (1968-1969), (1969-70) and (1970-71), and November-January (1971-72) and correspond to Commando Hunt I, III, V and VII. Values are given in estimated short tons.

	CH I	CH III	CH V	CH VII
A. Input	45,119	54,585	59,228	17,932
B. Throughput	8,537	18,947	7,135	1,100
B/A%	19%	35%	12%	6%

(S) No attempt is made to assess the tonnage which was destined for and required to sustain combat operations in South Vietnam. The above data are presented merely to describe apparent trends. Other factors involve tonnage consumed in Laos, tonnage destroyed by interdiction, and the time/travel histories of the throughput tonnages.

5. TACTICAL INTELLIGENCE EFFECTIVENESS DURING THE COMMANDO HUNT CAMPAIGN

5.1 Intelligence Needs

(U) Basic intelligence needs for interdiction operations fall generally into priority groupings as shown below:

Priority	Needs
1	Target Location, Location of Enemy Defenses, LOC Alignments, LOC Vulnerabilities, and Battle Damage Assessment
2	Enemy Mode of Operation, LOC capacities, new road construction activities.
3	Enemy strengths, dates and numbers of previous interdiction strikes
Other	Enemy Headquarter Locations and command organization, target recovery capability, weather in the strike area, terrain in target area, and BDA by strike aircraft type.

(C) Simply stated, the combat planner and commander need accurate, timely, and all source fused intelligence on: (1) the location of fixed and moving targets (generally time sensitive); (2) what the enemy is storing and moving; (3) the strength and location of enemy air defenses; (4) how and where the enemy is moving; (5) what his time and place logistics objectives are; (6) what damage is being inflicted upon the enemy; (7) vulnerabilities of, and specific results of interdiction efforts on, his logistics system, its elements and capabilities; (8) how his logistic objectives relate to the ground campaigns being supported; and (9) factors such as weather and terrain which influence strike operations effectiveness.

5.2 Intelligence Collection Means

(S) Intelligence collection means used for interdiction support may be divided into three general categories--HUMINT, SIGINT and SENSORS. HUMINT includes: MACSOG Reports, Prisoner Interrogations, Road Watch Team Reports, Agent Reports, and Strike Crew and FAC Visual Observations and Reports. SIGINT includes: COMINT, ELINT and Direction Finding/DF. SENSORS (airborne and ground) include: Photography, Surveillance and Warning Radars, Unattended Ground Sensors (acoustic and seismic), and Image Intensifiers. For details concerning collection means refer to Appendix D—A Survey of Intelligence Collection Systems Employed in Southeast Asia.

5.3 Some Intelligence Considerations

(C) Air interdiction in the Steel Tiger area of Southern Laos was a 24-hour operation, eventually extended to include "all weather." Almost 40% of all attack sorties (excluding B-52 sorties) flown during Commando Hunt Campaigns I, III, V and VII were night sorties. Intelligence support, in terms of collection means and analysis, differed significantly for day and night target planning and strike operations.

(C) Problems in intelligence support were compounded by terrain (jungle and extremely rugged), and the enemy modus operandi (predominance of movement at night). Furthermore, unlike South Vietnam, US ground combat forces were not available in Laos for additional intelligence inputs, especially post battle damage assessments. Most intelligence had to be collected by airborne means or, in the case of unattended ground sensors and Road Watch teams, using a type of airborne relay.

(S) Certain sensors developed for use in Southeast Asia were deployed primarily as an integral part of the combat attack weapon system. Intelligence collected by these sensors became an input for intelligence analysis, however, the "collection" resource was not under intelligence direction or control. Some sensors falling into this category include: strike cameras on fighter/attack aircraft; Night Observation Devices on

FAC aircraft and gunships; airborne ignition detectors; SLAR; and IR. The basic function of these sensors was to enhance the target destruction capability of interdiction strike forces. Any apparent redundancy in these systems appears to have been born of some frustration regarding ability to fix and destroy targets rather than an increased need to collect intelligence.

(C) As air interdiction in Laos assumed higher priority in Southeast Asia (as reflected by the Commando Hunt campaigns) intelligence needs became refined and the demand became increasingly greater for more intelligence of higher credibility and improved precision.

5.4 Some Specific Observations from Commando Hunt Operations

(C) The total impact of the air interdiction campaign upon the NVA/VC combat capability in South Vietnam was difficult to determine. It is generally conceded that air interdiction was unable to cut off all logistics and that enough supplies continued to flow into South Vietnam to sustain a NVA/VC combat capability which was unacceptable to the US and SVN. Air interdiction activities in Laos did exact heavy costs to the NVA and significantly delay logistic deliveries to their combat forces in South Vietnam.

(C) Lessons learned by the US during each Commando Hunt operation were effectively applied to planning for the succeeding campaign and air interdiction became progressively more efficient and cost effective.

(C) Photographic reconnaissance, though limited to daylight and good weather, remained a primary source for intelligence concerning: the condition of LOCs, the location of permanent or semi-permanent areas of enemy activity; the location of antiaircraft sites; the development of new roads and bypasses; battle damage assessments; and for providing aerial photographic coverage required for planning ground sensor emplacements, fixed location targeting, and planning strike aircraft approach routes to the target. One major problem in photo reconnaissance intelligence was the workload required for analysis and interpretation. The magnitude (volume) placed noticeable strains on the resources and capabilities of 7th Air Force Units.

(C) Hand-held photography collected by FAC aircraft crews was considered by TACAIR units, a premium intelligence source for studying choke points and fords, for locating bypasses, and for BDA. Strike cameras on attack aircraft also provided an additional source for this type of information. The value of such photography was more in its timeliness and the fact that crew members, having familiarity with specific geographic areas and having visually observed what was on the photograph, could orally augment the "take."

(C) Forward Air Control (FAC) operations were an indispensable intelligence collection asset. FACs could operate both day and night. Although their greatest intelligence capability was during daylight operations, the introduction of night observation devices significantly enhanced their night capabilities. One problem with FACs was vulnerability to air defense. Slow movers were especially vulnerable. Jet FACs such as Misty (F-100) and Wolf (F-104) were introduced for use in high intensity air defense areas. The Jet FAC proved almost as capable as the slow mover for detecting targets and recording BDA. The vulnerability aspect was decreased due to the speed and altitude capabilities of the jet aircraft.

(C) The Starlight Scope became almost a demanded requirement on the part of FACs (both slow and fast movers) due to its effectiveness under proper operating conditions.

(C) The Igloo White system (unattended ground sensors) constituted the only 24-hour all-weather intelligence collection system. Capabilities included target detection and location, development of LOC throughput trends and some BDA. Some of the problems encountered were: lack of an ability to always establish the exact location of all the sensors; an inability to distinguish vehicles by type; their vulnerability to countermeasures; and limitations in area coverage (lack of sensors) to fully compute values for logistic throughputs. Augmentation and/or sensor detection confirmations by FACs contributed to logistics input and throughput analysis.

(S) Road Watch teams were highly effective for gathering data on logistics volume and flow direction, however, coverage was limited. Lack of timeliness generally degraded their value for current strike operations.

(C) The most effective combination for moving target interdiction in the Steel Tiger area appeared to be ground sensors for target detection and tracking, FACs for confirmation and continuous follow-on surveillance, and gunships for final lock-on and destruction. The B-57 and A-26 were second in effectiveness on sensor identified targets. Night observation devices were of considerable help, especially on the B-57.

(S) Rules of Engagement (ROE), fairly strict prior to Commando Hunt, were significantly relaxed in 1968-69 affording greater flexibility for air interdiction operations.

(S) Intelligence on the existence of AAA and SAMs was generally provided initially by aircrews (FAC and strike). Reconnaissance photography and ELINT provided confirmation of AA/SAM order of battle and precise intelligence for strike targeting against the sites.

(S) Countermeasures. Three aspects need to be mentioned with respect to countermeasures. The lack of adequate secure communications for strike and ABCCC aircraft allowed the NVA certain early warning through which they could take appropriate cover to minimize interdiction damage. The FAC O-2 aircraft was quite noisy and provided enough time, from lookout recognition to when the FAC appeared over the area being surveilled, for personnel and vehicles to take cover. Although there was not a lot of evidence concerning countermeasures against ground sensors—the discovery, capture and destruction was noted on occasion—it is generally assumed that they could be countered or deceived quite easily. A case of self-induced countermeasure was noted. ECM aircraft supporting Arc Light strikes with electronic jamming interfered on certain ground sensor frequencies.

(C) Battle Damage Assessments were often impossible to make (especially for LORAN or RADAR bombing) and many times when made were incomplete due to bad weather, shortage of FACs, and weather and night limitations on photographic reconnaissance. An experiment was conducted on emplacing ground sensors for recording certain types of battle damage. The data on this experiment, though indicating some promise, was not sufficient for a judgment on effectiveness.

(C) Echelon of control during the air interdiction campaign was not a factor in determining the effectiveness of either the intelligence support or the interdiction operations. MACV, 7th AF, the Combat Operations Center (COC Saigon), 7th AF TACC, the ABCCC, TFA and all TACAIR units worked closely to achieve vertical and lateral planning and coordination. The allocation of control of strike aircraft to TFA during Commando Hunt I and during the Commando Bolt phase of Commando Hunt V did indicate that the 7th AF TACC and the ABCCC were not the only effective means of organization to implement interdiction operations. However, the extent of control of strike aircraft, allocated by 7th AF to TFA, does not permit sufficient judgments on the effectiveness of such ground based closed loop intelligence collection and analysis, targeting and strike control systems.

5.5 Usefulness of Intelligence

(C) Several factors influence any set of conclusions on the usefulness of intelligence, as collected by the available collection means, toward satisfying the intelligence needs for interdiction (especially for the case studied). These factors are: (1) The Steel Tiger area of the Laotian panhandle was target rich. The problem was more in target fixing and destruction than in developing more targets through intelligence. (2) The nature of enemy activities (most movements at night) resulted in the necessity to develop and deploy intelligence collection means for specific night use. This appears a redundancy of means since similar functions were being performed over the 24-hour period. However, these systems should neither be considered competitive, nor directly compared with each other as to usefulness. Each may have been equally useful considered in its own specific role. (3) Finally, the extreme difficulty in determining the real impact of air interdiction in Laos upon the outcome of the conflict in Vietnam precludes developing relative figures of merit for individual intelligence collection means.

(U) Despite the problematical factors addressed above, the general outcome of this case study would indicate the following with respect to intelligence usefulness:

(C) (1) Satisfaction of Needs - Intelligence needs were generally well satisfied for campaign planning, target development, and strike planning and operations. Moving vehicle targeting systems were capable of developing targets in excess of the strike capability. The weakest areas were in battle damage assessments and input/throughput determinations. However, intelligence should be credited with developing a standard system, using ground sensors and other collateral information, for computing reasonable trends in logistics input and throughput.

(C) (2) Usefulness of Means - The various collection means utilized for interdiction intelligence can be divided into two categories of usage: interdiction planning and targeting; and strike operations. Effectiveness criteria of greatest importance for the various collection means are availability and timeliness. Some means were useful for both categories of usage, others were useful only, or primarily, for the former of the two listed. Most HUMINT intelligence, except for FAC and strike crew reports, though lacking in timeliness, were always useful for subsequent planning and targeting. SIGINT intelligence can also be placed generally into this category —always useful but not always timely.

(C) Of all means reconnaissance photography appears the most useful, all-purpose system—not always timely, but most always extremely useful. Hand-held photography taken by FAC crew members was always useful <u>and</u> timely. However, photography effectiveness was limited to daylight good weather operations.

(C) FACs were indispensably useful both day and night, playing roles in surveillance, target location, strike direction, and battle damage assessments. Their intelligence was real time to near real time and generally comprised of first-hand reports.

(C) The usefulness of sensor systems is a difficult problem with which to come to grips. Igloo White (unattended ground sensors) was highly useful within its limitations. It was the only 24-hour all-weather system available. It provided limited real time intelligence due to the average target life of fleeting or moving targets. Most sensor detections required confirmation by FAC. However, they did allow for some resource conservation by determining the most lucrative target areas for the FACs. Igloo White also provided longer term intelligence which was quite useful for developing fixed target areas and for computing logistics input and throughput. Shortcomings of the Igloo White system have already been discussed in other parts of this report.

(S) Various other sensors, e.g., night observation devices (other than starlight scope) LLTV, SLAR, IR and ignition detectors all played their specific roles with varying degrees of effectiveness and usefulness. Generally, the sensors were an integral part of the interdiction weapons system and their usefulness to intelligence was secondary, specific in application, and results were sometimes contradictory due to resolution or improper analysis.

(C) In summary, it is generally concluded that most intelligence means used for interdiction were sometimes to always useful in satisfying interdiction intelligence needs. No single means was capable of satisfactorily providing for even a large percentage of the needs. Means were plentiful but not unnecessarily redundant. Experience with innovative collection means during the Commando Hunt operations was a significant milestone toward the development of a highly useful family of collection means to cover the spectrum of day/night all-weather needs.

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Survey of Intelligence Collection Systems Employed in Southeast Asia (U)

FOREWORD

(U) The Southeast Asia conflict resulted in the introduction of a great variety of conventional and other technologically rich tactical intelligence collection means into tactical operations. Several collection means (radar, HUMINT, etc.) were based on techniques which had been used in Korea or were under development when the Vietnam conflict intensified. A great variety of other techniques, however, were based on new innovations which were, either, natural outgrowths of the current state-of-the-art (image intensifiers, IR scanners, etc.), or represented the accelerated evolution of new technologies developed in response to particular conflict requirements (unattended ground sensors, personnel detectors-sniffers, etc.).

(U) The purpose of this Appendix is to provide a general description of the various tactical intelligence collection means which were used in the Southeast Asia conflict. The material presented is basically descriptive where each collection means is described in terms of the

- particular technique being used
- typical equipments
- comments on time and extent of deployment
- echelon at which the equipments were controlled
- performance characteristics, and
- operational effectiveness comments as appropriate.

Each section addresses particular tactical intelligence collection means and in that respect it is self-contained.

CONTENTS

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1. RADARS

1.1 GROUND RADARS

1.1.1 Ground Surveillance Radars

(C) The Army's first generation of ground surveillance radars, fielded in the late 1950's (AN/PPS-4, AN/TPS-33, AN/TPS-25), were all non-coherent pulse-doppler radars using MTI techniques to detect moving personnel and vehicles. They used aural means and A-scopes for target detection, and were too heavy to be used by moving units. Their characteristics are summarized[1] in Table 1.1, along with the characteristics of the AN/PPS-5 which is a later radar used in Vietnam. The AN/PPS-5 is also a non-coherent MTI, pulse radar that uses multi-range gate techniques and a B-scope display to provide all range simultaneous search capability. Although the AN/PPS-5 is small (about 100 lbs) and light enough to be transported into forward positions, it is still too heavy to be carried on continuous mobile operations or to be used while being carried.[1] The stated maximum ranges in Table 1.1 are ideal maximum detection ranges. When these equipments are used in the field, the detection range is controlled by lines of sight, target and background characteristics, and other operational factors. For example, controlled men and vehicle detection tests (at CDCEC) with the AN/PPS-5 indicated that the detection range occasionally exceeded 3,000 meters; while in infantry battalion low-intensity field tests at Project MASSTER, the maximum range for the same set was 875 meters primarily due to restricted LOS conditions even with careful selection of the radar sites.

(C) The stated primary mission for these radar sets is to "detect, locate, and identify moving ground targets, such as personnel and vehicles, with sufficient accuracy to produce meaningful combat intelligence. A secondary mission is to locate targets with sufficient accuracy to permit fire by crew-served weapons such as machine guns, mortars, and artillery."

Table 1.1 (C)

Ground Surveillance Radar Characteristics (U)

	AN/PPS-4	AN/TPS-33	AN/PPS-5	AN/TPS-25
Type	G to G, non-coherent pulse doppler, MTI radar	Same	Same	Same
Frequency (MHz)	8,900 - 9,600	9,375 ± 30	16,000 - 16,500	9,375 ± 30
Peak Power (KW)	0.5	7	1	43
Average Power (W)	0.5	4	1	40
Range	Max: 6 km (vehicles) 1.5 km (men)	Max: 9 km (vehicles) 1.8 km (men) Min: 90 meters	Max: 10 km (vehicles) 5 km (men)	Max: 18 km (vehicles) 4.5 km (men) Min: 450 meters
Accuracy	± 20 m range ± 10 mils azimuth	± 20 m range ± 13 mils azimuth	± 20 m range ± 10 mils azimuth	75 m range ± 2.5 mils azimuth
Display	Aural	A-scope; any 1 km or 5 km range segment selectable (also aural)	A-scope B-scope aural	A-scope; any 900 m segment selectable (also aural)
Sector Scan	Manual: 4 detents adjustable 60 to 540 mils	Automatic: 30, 140, or 360 deg	Automatic: 30, 60, 90, 110 deg selectable	Automatic: 180, 360, or 540 mils selectable
Crew	1	3	2	1
Transport	vehicle or man-pack (3 men)	vehicle or man-pack (6 men)	vehicle or man-pack (3 men)	1.5 ton trailer transporter

(C) The method of employment and the level of control in Vietnam varied with the tactical situation. In many instances local commanders improvised in the uses of these equipments and often enhanced their performance. Some particular operations uses are summarized below:

- In some instances the AN/PPS-5 sets were used in conjunction with Night Observation Devices (NOD) to enhance the search detection/recognition capability of the combined system.[2]
- Traditionally sets were used in fire support bases and base camps. However, in cases where there was no fear of massive enemy assults, they were used by maneuver battalions in offensive operations seeking active and lucrative target areas.[2]
- The 101 st Airborne Division developed a technique called a "radar raid" using AN/PPS-5 and AN/PPS-4 sets which were quickly deployed by security forces on dominant terrain outside of fire bases. These raids provided surveillance of infiltration routes invisible from the fire-base and target information for artillery attacks from the fire bases on detected targets.[3]
- In another application the AN/PPS-5 radar set was used to monitor the movements of an ARVN unit and a VC squad and to vector the ARVN unit in attacking the VC squad.[4]
- The AN/PPS-5 was also used from a patrol base to monitor the area around a night ambush patrol (Company A, 2nd Battalion, 12th Infantry) at a distance of 1200 m from the patrol base. During this operation and shortly after a brief firefight a group of enemy was detected by the PPS-5 about 100 meters from the patrol. The patrol was alerted and using a starlight scope detected the enemy and engaged it. Even after this firefight, as the patrol was returning to base, another group trailing the patrol was spotted by the AN/PPS-5. This group was subsequently engaged by artillery.

- In a similar action, Company B, 2nd Battalion, 14th Infantry employed a AN/PPS-5 to monitor the area of their night ambush patrols operating from Patrol Base Hunsley. Several repeated sighting of small moving enemy groups in the area by the AN/PPS-5 resulted in the discovery of a group of 30-50 enemy at a distance of 50 meters from one of the patrols.[5]

- Some units used the AN/PPS-25 to pinpoint the location of a helicopter hovering above the location of an unattended ground sensor field (which is feasible due to the large detection range of the AN/PPS-5). This information was then used to register artillery for attacking targets that were subsequently detected by the sensor field.[6]

- AN/PPS-25's were used in close coordination with counter-mortar radars (AN/MPQ-4A) to detect the location of enemy mortar units by the AP/PPS-25 and point the AN/MPQ-4A in the proper direction for detecting incoming rounds, and directing artillery fire. The AN/PPS-25 was also used for damage assessment after the engagement.[5,7]

- The 9th Infantry Division used ground surveillance radars in conjunction with sensor fields to "track" enemy movement after detection by unattended ground sensors.[8]

- The 25th Infantry division used ground surveillance radars in the following way:[9]

  - vector friendly units
  - direct snipper teams in enemy territory
  - vector aircraft into target areas
  - vector reinforcement units
  - vector sweep elements
  - select ambush positions
  - damage assessment for artillery fire and adjustment of fires.

(C) The list of particular uses for the ground surveillance radars indicates that, although these radars had inherent limitations (weight, old technology, line-of-sight problems, etc.), in the hands of ingenuous local commanders they found numerous applications for night operations, especially when used in conjunction with other sensory devices.

1.1.2 Ground-Based Foliage Penetration Radars[10]

(U) The dense foliage present in Vietnam limited severely the range capability of conventional ground surveillance radars. To improve radar performance under foliage conditions, an ARPA sponsored program was started with the Lincoln Laboratory. The result of this program was the development of the Camp Sentinel Radars. The basic objective of this program was to determine the feasibility of radar providing early warning of walking intruders. The Lincoln Lab built a service test model called CSR II which was tested in combat situations in Vietnam in 1968-69 and considered to be very useful.

(C) The original radar was solid state and provided coverage out to a range of a few hundred meters. An Army modification added a vacuum tube final amplifier to the transmitter. Thus augmented, the CSR II range increased to 2 kilometers.

(C) The CSR III employed higher power and other improvements. One of the five developed CSR IIIs was put through MASSTER testing. The other four were deployed overseas. In general, these radars proved to be effective against intruders in triple canopy jungle and in clearings around base camps. The range capability varied with the conditions. Shorter ranges on the order of 1 km were obtained in very heavy foliage.

(U) The CSR radars are characterized by:

1. Foliage penetration capability using UHF (435 MHz) carrier frequencies.

2. Coherent range-gated pulse doppler MTI signal processing.

3. Electronically step-scanned antennas, consisting of 32 dipoles on a cylindrical ground screen about 12 ft in diameter and 3 ft high, which:

   a. Eliminate scan modulation of clutter returns

   b. Provide continuous 360-degree coverage in azimuth (by stepping through 32 contiguous 11-1/4 degree beams) .

   c. Provide spotlight mode coverage of areas of interest without interruption of the 360-degree surveillance

4. Automatic alarms

5. Balanced doppler (Kalmus) processing which reduces false alarms due to moving foliage

(U) The system is packaged, complete with 100 foot self-erecting antenna tower, on a four-wheel trailer. It can be truck-towed, air-transported in a C-130, or slung under a Chinook or equivalent helicopter. System weight is about 8000 pounds. It is self-contained except for prime power source.

(U) Relatively large antenna heights (100 feet) are required for long-range FOPEN (foliage penetration) operations; that is, the radar must look down upon the surrounding foliage rather than out through it. This requirement for a high antenna complicates the emplacement and turns the radar site into a rather distinctive landmark which may be identified from far away.

(U) In 1969, Lincoln Laboratory with Air Force and ARPA sponsorship began extending FOPEN intrusion detection to area coverage for base defense applications. The objective was the detection of infiltrating mortar crews so that mortar attacks might be prevented. An experimental radar was built atop a hill adjacent to Lincoln Laboratory and was known as the LRDR (for Long Range Demonstration Radar). It had the following parameters:

Frequency	430 MHz
Antenna	
Type	Cylindrical, electronically steered array
Size	70 feet diameter by 8-1/4 feet high (100 feet above the ground)
Beamwidths	2-1/4 degrees (azimuth) by 14 degrees (elevation)
Gain	29 dB
Pulsewidth	3.2 microseconds compressed to 0.1 μs
Average Power	200 Watts
Peak Power	20 kW
System Noise Figure	8-1/4 dB (arising from a 2 dB receiver noise figure and some 6 dB of RF losses)

(U) The signal processing part of this experimental radar is completely digital. It used 7-bit 10-MHz A/D converters and a digital processor called the FDP (Fast Digital Processor) which is capable of making a 64 point FFT every millisecond. For a coherent integration period of about 2-1/4 seconds, the radar can process 1024 range-azimuth cells at a time and provide MTI improvement factors on the order of 75 dB. Doppler resolutions of a fraction of a Hz are obtained.

(C) The radar was used for testing the feasibility of area coverage FOPEN operation, and to make high resolution measurements of clutter and target spectra and the effects of propagation phenomena. Detections of a single man in typical New England foliage at ranges greater than 10 km were obtained. The radar could detect a single man near strong fixed clutter (e.g., a radio tower) at clutter target cross section ratios of

60 dBsm. However, the sensitivity of the system was degraded significantly by clutter motion when surface winds exceeded about 15 knots. Assessing false alarm rates in populated areas like New England is very hard because there are many legitimate moving targets. This was a problem in Southeast Asia as well. The CSRs detected and tracked leopards, tigers, and particularly, monkeys. The optimum frequency for this type of operation may be lower than 430 MHz.

(C) Other ground-based FOPEN activity have been confined to shorter range lightweight systems. The following developments are typical:

PPS-14--a small, troop-transportable system at L-band, considered to be effective to 140 meters against a single walking intruder. Twenty-five of these little systems were built and are in use in various service test programs.

PPS-20--L-band, effective to 500 meters, and provides some monopulse azimuth information.

"Multi-purpose FOPEN"--a small system at 140 MHz, designed to detect single men through 500 meters of dense foliage. Six units have been made, and currently completing field testing in Hawaii.

HADDER--a hand-deployed radar sensor, and ADDER--a parachute-deployed tree hanger--both unattended radars developed by Westinghouse for the REMBASS program in 1971. They are high-PRF (40 KHz), pulse-doppler, range-gated, VHF, 1-Watt radars, weighing about 20 lb with batteries for 60 days of operation. They are designed to detect moving men and vehicles in the 0.75-10 mi/hr range, and have ranges on man-sized targets at 100 to 150 meters in foliage.

1.1.3 Counter-Mortar Radars[10]

(C) The AN/MPQ-10A, developed and produced by the Sperry Gyroscope Company, was the first counter-mortar radar deployed in quantity (485 sets). These radars were delivered in 1952 and found some use in the Korean War and in the early part of the Vietnam War. Operating at S-band, the radar employs a pencil-beam, mechanical-scan search over a 45° azimuth, 20-km range sector, with the beam elevated sufficiently to avoid mainlobe ground clutter. Upon detection of a target, the operator notes its position and slews the antenna and range gate for acquiring subsequent shots. Upon acquisition and tracking of a round, the projectile track data is displayed on a plotting board and the operator manually projects the track to estimate the mortar location. The major deficiencies of the system are its inability to locate from single-round data, the requirements for manual trajectory extrapolation (slow and inaccurate), its limited sector coverage, and its susceptibility to false alarms from ground clutter, birds, and insects. Its operation was unsatisfactory against mortar shells and nil against artillery shells and rockets.

(U) The next operational counter-mortar radar, the AN/MPQ-4A, was manufactured by General Electric during the late 1950s (about 200 sets) and has found considerable use in Vietnam. The antenna operates at 16 GHz and uses a 90 × 66 inch parabolic cylinder fed by a Foster scanner to produce 17 azimuth scans per second (a 25° azimuth 10 km range sector). A two-beam intercept technique is implemented by displacing alternate azimuth scans by two degrees (≈ 2 beamwidths). The operator manually determines the elapsed time for the projectile to move from one beam to the other, and feeds this information and the radar coordinates of the two hits to a computer. A combined operator-computer operation is then used to determine mortar location, because topographic maps must be employed to correct for local terrain heights.

(C) The track-while-scan operation of this radar offers considerable improvement over the AN/MPQ-10A. However, the requirement for manual operation still imposes a serious limitation on traffic handling. The narrow field of view (25° azimuth) was found to be a serious limitation in Vietnam, where hostile weapons frequently surrounded a defended area. As for the AN/MPQ-10A, the system suffered from false alarms from ground clutter and birds. An experimental MTI system was being developed in 1967, but the degree of success of the modification is not clear.

(C) Although the AN/MPQ-4A achieved limited operational success,[11,12] it was evidently not considered satisfactory for Vietnam operation. Several interim development programs were conducted to modify existing radars for assisting the AN/MPQ-4A by localizing its search sector, or for performing mortar-location autonomously. For example, the AN/MPQ-35 radar is a modified HAWK surveillance radar, and the AN/TPN-8 ground controlled approach radar was also modified for mortar location. Other mortar-location radar programs were conducted (e.g., the AN/MPQ-33, 34) but were evidently terminated as unpromising. A program for developing an artillery location and registration radar, the AN/MPQ-32, was also started in the early 1960s but subsequently cancelled because of its unusual complexity and size, evidently resulting from unrealistic specifications. It was apparently becoming clear by the late 1960s that the problem of mortar and artillery-battery location was very difficult, and that new technologies would have to be brought to bear on the problem.

(U) The AN/TPQ-28 parameters were derived from Vietnam requirements. Three developmental models were built by the Gilfillan Company for field testing. The program was started in 1966, with a one-year delivery requirement, but development and testing difficulties prevented its use in Vietnam. The program was considerably reduced in scope in 1969 and the existing hardware became a testbed for other programs.

(C) The AN/TPQ-28 was designed to be an automatic, 360° coverage, first-round mortar-locating system. It uses four separate antenna/transceiver groups, each covering slightly more than 90°. The phased-array antennas are X-band, using frequency-phase scanning, and the 5 × 5 ft aperture produces a beamwidth of 1.4°. The range requirement is 10 km on a 0.001 m^2 target, and the specified CEP is 50 meters at this range. A traveling-wave tube transmitter generates 30-kW peak, 300-W average power.

(U) The data processor for this radar provides beam steering commands, system programming, target detection, clutter analysis, and trajectory analysis. The clutter analyzer maps clutter signals, for use in the MTI operation and to exclude high-clutter areas from search (e.g., programming the search to higher elevation angles for high-clutter areas).

(U) Search is performed by a single-beam elevation fence, with a scan rate of 10 per second. After detection of a target, the beam is stepped approximately one beamwidth above the "hit" and a range-azimuth-elevation measurement is made. Further data points are taken at intervals until the target passes out of the two-beam elevation sector. The computer uses this data to compute the mortar location, assuming terrain heights for the radar and the mortar. If the mortar location and height do not check with the operator's map, he increments trial height values until one is found which checks with that of computed location. The radar can handle ten target tracks simultaneously, but the traffic-handling capability would probably be limited by operator performance.

(C) Field tests of this radar indicated several deficiencies, notably the need for higher elevation angle tracking and for better doppler discrimination. False alarm rates from birds and insects were troublesome. These difficulties and the timely reduction in Vietnam fighting led to the curtailment of the AN/TPQ-28 program.

1.2 AIRBORNE RADARS

1.2.1 Mohawk Side Looking Radar

(U) The AN/APS-94C is the main Army operational airborne MTI radar for ground target observation. It is installed in the Mohawk OV-1B aircraft as a side-looking (non-scanning) reconnaissance radar. It is a component of the AN/UPD-2 radar surveillance system, which also includes the AN/AKT-18 Radar Data Transmitting Set, the AN/TKQ-2 Radar Receiving Set, and the RO-166/UP Recorder-Processor Viewer.

(C) The AN/APS-94C SLAR system provides permanent aerial radar imagery of ground targets within 25, 50, and 90 km range on either or both sides of the aircraft flight path. Fixed terrain and moving target information is recorded on a 9-inch film strip in the RO-166/UP which permits the airborne sensor specialist to view the imagery in the cockpit approximately two minutes after exposure. The radar data transmission system in conjunction with the AN/TKQ-2 ground station permit simultaneous display of the imagery at the ground station terminal up to a line-of-sight range of approximately 100 nautical miles.

(C) The radar operates at X-band, and uses a back-to-back 18 X 2 ft antenna which generates fan beams (0.5°az, csc^2 el) normal to the aircraft axis. The system employs a noncoherent, range-gated MTI, which provides about 35 db clutter cancellation with an on-target time of 0.1 s. A light ground surface background is superimposed upon the display of moving targets. Other parameters[1] of the radar are:

Peak power	65 kw
Frequency	9,245 ± 5 MHz
PRF	750 Hz
Pulse width	0.5 μs
Range	180 km on vehicles (20 m^2)
Display	film mapping as the aircraft flies by the target area

(C) The AN/APS-94 radar has also been tested as a helicopter-mounted scanning surveillance radar in the ALARM system (alerting long-range radar for MTI). The radar antenna is scanned once per minute to continuously cover a circular area. The MTI is coherent, and helicopter velocity compensation is provided up to velocities of about 45 knotts. Current efforts on the ALARM program involve display development, data evaluation techniques and further definition of the system operational concept.

(C) The target detection capability of the AN/APS 94 varies with target radar cross section; the target radial velocity with respect to the aircraft, and the ground clutter. Reference 1 gives one example of detection capability; 1/4 ton vehicle at a minimum radial velocity of 5 mph. Reference 10 gives other examples derived from the ALARM tests; with the radar platform at 5000 feet walking men were detected at 22 km range and moving jeeps at 60 km range.

(C) Since the detection capability is a function of target radial velocity, targets which move parallel to the aircraft flight path will not be detected. Consequently, when lines of communication (roads, carriers, etc) are under surveillance, the aircraft should not fly in a parallel path. Another difficulty with target detection is the speed with which the moving scene moves on the display. As the scene moves in the display, targets can be detected, but display size, speed of scene movement, and large target range (up to 90 nautical miles) do not permit accurate target location.[13] This is the reason why Mohawk OV-1B tests[2,14] at Project MASSTER did not produce positive detection of vehicles and sampans within the test criterion of ± 500m target location accuracy. This implies that although the Mohawk OV-1B is an acceptable all-weather aerial surveillance system (especially since the permanent film imagery record can be examined after the flight) it may not be a useful means for target acquisition with sufficient accuracy to direct timely and accurate fire on detected targets.

(C) The Mohawk System in Vietnam was normally deployed[15] in Surveillance Airplane Companies (SAC) under the operational control of Corps/Field Forces and MACV. Only two of the seven US divisions deployed in Vietnam had organic Mohawk aircraft in Aerial Surveillance and Target Acquisition Platoons (1st Infantry Division, and 1st Airmobile Cavalry Division).[15] SAC units consisted of 18 Mohawk OV-1A (visual/photo) aircraft, six OV-1B (SLAR/photo), and 12 OV-1C (IR/photo). In addition each SAC had 14 Ground Sensor Terminal (GST) units. The investment of cost in this type of unit is considerable with OV-1B, with sensor, priced at $1,805,715 and the OV-1C priced at $1,559,881.[15]

(C) Beginning in 1965 and through mid-1967 all in-country and certain out-of-country aerial surveillance and reconnaissance missions were under J2 MACV Headquarters control. MACV had two SAC units; the 73rd SAC located at Vung Tan in the III CTZ and the 131 SAC located at Hue/Phu Bai in the I CTZ. The 131 SAC was dedicated to out-of-country reconnaissance, with missions being approved by MACV but initiated from the 7th US Air Force to support ongoing interdiction programs. By 1967 enough resources had arrived in the country to implement the planned Corps support plan. The Corps Mohawk unit assignments by then were as follows:[15]

Unit	Operational Area	Operational Control
245th SAC	I CTZ	III Marine Amphibious Force
225th SAC	II CTZ	I Field Force, Vietnam
73rd SAC	III CTZ	II Field Force, Vietnam
244th SAC	IV CTZ	Senior Advisor, IV Corps
131st SAC	Special Mission	J2, MACV[16]

Most controlling headquarters allocated daily a fixed number of Mohawk sorties to subordinate commands while at the same time fulfilling other MACV Reconnaissance Plan requirements. US Air Force airborne radar and infrared assets were also integrated into the reconnaissance/surveillance program of the Corps areas; however, the lack of a data link and an in-flight readout capability (for radar and IR imagery) in the Air Force aircraft caused an extended time lag between request and delivery (for information) which made this asset the least desirable for tactical units.[15,17]

(C) The major shift in Mohawk aircraft use came in 1968, following the Tet Offensive, in response to the increasingly elusive tactics of the enemy. The emphasis in that period was to locate and fix the enemy before he could build-up for attacks against the population centers. What was really needed was a real or near real time recce/strike system with night and all weather capability. Instead local commanders pressed by the need and unencumbered by knowledge of the capabilities and limitations of the system levied near impossible missions on the equipment. Of ten senior US commanders in Vietnam seven stated that they had devised some type of immediate reaction tactic to SLAR and IR detected targets. These varied from hunter/killer teams of a Mohawk SLAL or IR aircraft, an illumination ship, and a helicopter team flying in tandems, to the employment of air/artillery strikes and ground reaction forces.[15] The demanding nature of the recce/strike process, the on-board display (and sensor) limitations, and the spotty availability of Ground Sensor Terminals resulted in less than satisfactory results from the Mohawk system. Although some of the improvisations and locally designed tactics met with success, in general the Mohawk system when put in a pure target acquisition role exceeded the capabilities for which it was specifically designed.[15]

2 <u>INFRARED SYSTEMS</u>

2.1 AIRBORNE INFRARED SYSTEMS

2.1.1 <u>Infrared Surveillance Equipment</u>

(U) Airborne infrared surveillance equipment produces a continuous strip map of the terrain over which an aircraft flies, usually by scanning the ground along lines directly under the aircraft perpendicular to the flight path. The strip map is a record of the reflectance of objects (when near infrared or visible wavelengths are used) or of their temperature and emissivity (when middle or far wavelengths are used).

(U) Such scanners have a long development history going back to the early 1950's. This sensor development continued during the Vietnam operations and resulted in two principal, closely-related systems — that employed by the Army in the OV-1 Mohawk, and that used by the Air Force in the RF-4B and RF-4C aircraft. These will be treated in the following subsections.

2.1.1.1 The OV-1 Mohawk System

(C) The principal use of infrared surveillance equipment by the Army was in the OV-1C Mohawk aircraft. The OV-1C had the purpose of providing the Army with an organic aerial surveillance capability for performing all-weather, infrared surveillance, plus visual and photographic surveillance to satisfy a variety of mission requirements.[1]

(C) The OV-1D Mohawk is a product improvement in the Mohawk program, providing the combined capabilities of the OV-1A, B, and C aircraft in one airframe. In its IR version it carries the AN/AAS-24A infrared equipment, an updated version of the AN/AAS-14A sensor carried in the OV-1C. The two systems are compared in Table 2.1. It appears that the OV-1D was not operational in Vietnam, and the following paragraphs are concerned with the OV-1C.

(C) The complete infrared system employed in the OV-1C Mohawk is designated the AN/UAS-4A. This system provides passive aerial surveillance of terrain during daylight and darkness. It detects, displays, and records the infrared radiation caused by temperature differentials on the terrain such as road surface, vegetation, fires, internal combustion engines, ships' wakes, and so forth.

(C) The AN/UAS-4A includes the airborne equipment Detecting Set AN/AAS-14A and the Radio Transmitter AN/ART-41A. Ground equipment is the Ground Surveillance Center AN/TAQ-1A or AN/TAQ-1B. When mounted in the OV-1C Mohawk aircraft, the detecting set monitors the terrain, provides a cockpit display, and makes a photographic film record of the display.

Table 2.1 (S)

Summary of Infrared Surveillance Sensors (U)

Type	AN/AAS-14A	AN/AAS-24	AN/AAS-18	AN/AAD-5
Strip Width, Deg	80	80	120	60, 120
V/H Range, RAD/SEC	0.03-0.8	0.03-0.8	0.016-2.60	0.016-2.60
Number of Detectors/Band	1	8	2	36
Spectral Regions	Visible, 8-14 μm	5 regions 2-14 μm	8-14 μm	8-14 μm
Resolution, MR	4	2.5 (CRT)	(1.5 x 1.5) or (1.5 x 3.5)	0.25 - 0.5
NETD*, K	0.1 K	0.3 K	0.2-0.3 K	0.2 K
Notes	Original OV-1C Equipment	Updated AAS-14A for OV-1D	Designed for RF 4B, RF 4C	Updated AAS-18

*Noise Equivalent Temperature Difference

Simultaneously, the radio transmitter telemeters the data to the Ground Surveillance Center, which provides a display identical to the airborne display and makes a similar film record. These CRT displays provide a surface infrared radiation map in any one or two of three available IR wavelength bands. The AN/TAQ-1B provides near real-time display of the processed photographic record of the imagery, in addition to the CRT display. The Ground Surveillance Center is mounted in a shelter on a 3/4-ton truck, which tows the necessary power-generating equipment.

Deployment, Control, Analysis, and Dissemination

(U) The deployment and the echelons of control, analysis, and dissemination for the OV-1 Mohawk in Vietnam have been covered in Section 1 and will not be described again here.

Operational Comments

(S) The OV-1C Mohawk infrared equipment was an effective intelligence sensor in Vietnam. However, it suffered shortcomings in method of employment, in equipment performance, and in reliability. The OV-1C AN/UAS-4A system was originally conceived as a sensor for providing Combat Surveillance. Combat Surveillance is used to accomplish continuous (all-weather, day and night) systematic search over battle areas to provide timely information for tactical ground operations.[18] The OV-1 Mohawk was the only army sensor system capable of this role. As described in Section 1, it was generally employed in this way prior to 1968, but after the Tet Offensive, more pressure was placed on target acquisition.[15] Target acquisition is specifically concerned with the detection, identification, and location of a target in sufficient detail for the employment of weapons.[18] A great deal of subsequent use of the OV-1 system was in this role, even though the system was not ideal in this mode. In tests under MASSTER, at Ft Hood, Texas, August 1970, the OV-1B and OV-1C were considered ineffective in target acquistiion; this conclusion was based on the test criterion of locating a target within ±500 meters and within ±15 minutes, which was not within the capabilities of the systems.[2] Also, the airborne CRT display was found to be difficult to interpret. However, 7 out of 10 senior commanders interviewed in Vietnam stated that their units had some immediate reaction capability, either a Hunter-Killer operation employing an illuminator ship and a gunship, or planned air-artillery strikes. Often, all IR (and SLAR) inflight detections were passed on for immediate artillery engagement.[15]

(S) One of the principal advantages of the equipment, aside from the possibility of inflight detection, was the availability of the Ground Sensor Terminals (GST), which, when operational, greatly reduced information time delays over those obtainable with photography. Tests seem to indicate that the best employment of the system is achieved when the aircraft are controlled at Corps level to increase flexibility but GST equipment is located at Division level to reduce response time.[15]

(S) Two classes of problems appeared during the use of the AN/UAS-4A equipment. One class appears to be inherent in the use of infrared strip mappers, the other was associated with this particular equipment. Problems with the use of infrared, in general, included the following: infrared is not valuable in areas with a high population density because there is no discrimination between friendly and enemy activity. The equipment was used to locate cooking fires, but in areas where there were many fires—either started by artillery or by Vietnamese burning rice fields—this was not effective. In jungle areas and in mountain areas where there was heavy foliage cover, infrared was not very effective, although perhaps slightly better than photography. In mountain areas, flying at a constant terrain altitude was a problem; this made the equipment less effective. The infrared presentation may be rather difficult to interpret.

(S) The AN/UAS-4A equipment itself had certain shortcomings. Principal was the fact that the GST's experienced a great deal of down time—probably at least 50 percent under operational conditions. The sensor would have been more effective, it is felt, with a smaller detectable temperature difference and with better angular resolution, which would have allowed better target identification or higher altitude flight. The system performs best at altitudes between 250-1500 feet, although an altitude of 2000 feet has been found suitable for standard operations in Vietnam.[15] At 2000 feet, the 4 mr resolution yields a ground resolution element of 8 feet. The latter characteristic is improved in the AN/AAS-24 sensor in the OV-1D.

2.1.1.2 The RF 4C System

(C) The principal infrared surveillance equipment employed in Vietnam by the Air Force was the AN/AAS-18 sensor mounted in the RF 4C aircraft which was specifically designed for multi-sensor reconnaissance.[19]

(C) The AN/AAS-18 is a scanner similar to the AN/AAS-14A; it looks vertically down and is intended to operate primarily in the 8-14 μm region. Pertinent sensor characteristics are given in Table 2.1. After 1971, a development program was initiated leading to the AN/AAD-5 sensor, having improved performance and designed to replace the AN/AAS-18.[20,21] This sensor is also described in Table 2.1.

Deployment and Control, Analysis, and Dissemination*

(C) In Vietnam, a single location (Tan Son Nhut Air Base, South Vietnam) served as the primary base of operations. Reconnaissance flights were carried out by other bases, which performed initial interpretation of imagery. If targets were found requiring immediate attention, a flash report was submitted to Tan Son Nhut, which then scheduled strikes from various bases, depending on aircraft availability or target location with respect to base location. The normal procedure was then for imagery to be relayed to Tan Son Nhut for secondary interpretation and then forwarded to Washington, D. C. for further evaluation.

Operational Comments

(C) The AN/ASS-18 was often employed for flight-line recovery. In this mode, during nighttime missions the infrared set operates continuously, thus allowing the exact flight path of the airc ft to be retraced and occasionally bonus targets to be recovered.

(C) The infrared equipment was valuable in fire detection and for bomb damage assessment. Damage assessment was possible through smoke at burning POL storage areas. Also, during the rainy season, bomb craters

*NOTE: (U) The following discussion of the operational use of the RF 4C is based on experience in the last half of 1966, reported in Reference 22.

fill with water and present good infrared targets which were used for locating impact areas accurately. Infrared was also used for road and route surveillance, and for vehicle and personnel movements.

(C) An important characteristic of the infrared equipment appears to have been its capability for producing continuous imagery during flights. The interpretation of this imagery led to the identification of damage to bridges and the establishment of bypasses, location of vehicles and boats, location of possible airfields, and the detection of areas containing many "hot spots" which might be vehicles or fires. In many cases, after detection of possible enemy installations or hot spots, photographic missions were flown to collect more detail and make identification certain.

(C) Infrared surveillance had significant advantages over photographic surveillance in these operations. It could be obtained at night continuously and passively. In continuous night photography, flash cartridges are ejected at prescribed intervals to allow 60 percent forwar overlap. Enemy antiaircraft can utilize this to locate the aircraft. Also, infrared imagery provides easy detection of hot spots which often result from vehicles or fires; this speeds image interpretation.

(C) Associated with the use of infrared were a number of problems in operational procedures and capabilities as well as in the infrared process itself. Some of the more significant of these were: Night navigation to point targets (such as bridges or missile sites) was a problem. A manually-triggered special-interest film marker would have allowed a pilot to flag areas in which he had noticed targets of interest. The resolution of the infrared equipment was too low for the desired mission altitudes (as determined by photographic requirements). There was a tendency to operate infrared equipment so that only hot spots and no terrain background was seen; this resulted in missing certain near-ambient temperature targets. The original equipment responded to short-wave radiation; thus daytime imagery was worthless because solar reflections masked thermal radiation. Pilots were unfamiliar with infrared phenomena and equipment details such as areas of coverage. Interpretation of imagery by photo-interpreters was somewhat deficient; without special training, interpreters may not properly interpret the differences between reflected light imagery (photography) and emitted radiation imagery (infrared). Finally, there was a persistent problem with the AN/AAS-18 mount in the RF-4C which permitted engine vibration to be transmitted to the detector. Thus the equipment did not achieve in normal operation the ultimate resolution of which the system was capable. In Southeast Asia the application of IR imagery included determination of levels of enemy activity as well as individual hot target location, so that both high angular resolution and good temperature sensitivity were required.

(C) For all of these reasons it cannot be said that airborne infrared scanners were as useful operationally as they could have been in Vietnam. For this reason, care should be taken in drawing inferences with respect to IR scanners for other operational situations.

2.1.2 Forward-Looking Infrared Sensors

(S) Forward-looking infrared sensors (FLIRs) form optical images of objects by their own radiation. The present state of the art permits the formation of television-type images having some 200 x 300 picture elements, with a frame time of 1/30 second and a minimum resolvable temperature difference of 0.1 to 0.3 K.[10]

(S) The principal use of FLIRs has been for navigating aircraft and for target acquisition. Their great advantages consist of their passive mode of operation, their nightime capability, and their useful haze penetration. Performance of FLIRs in fog is better than can be achieved in the visible spectral region; ranges are typically about twice as great. However, image contrast in FLIRs is strongly reduced under conditions of high humidity; this may limit FLIR usefulness.[23]

(U) During the development of FLIR technology, a bewildering variety of sensors has been built. A recent unclassified survey listed over thirty different equipments. There are at present two main lines of development: parallel scanning FLIRs and DISCOID-type FLIRs (Direct Scan Operating with Integrating Delay).

(U) Parallel-scan FLIRs represent a mature technology, having been worked on for some 10 years. They are based upon scanning the scene with a large number of detectors (50 to 200), each one of which scans only a portion of the scene and represents one line of the display. The display can be of the direct type, in which the signal from each of the detectors is used to drive a light source (light emitting diode) that scans the observation space at the same rate as the detector scans the target space. The light sources are either observed directly, with the human eye performing the integration, or indirectly by having an intermediate vidicon produce a television signal for display on a television screen. Parallel scan has the advantage that the rate of motion of scanning mirrors is relatively slow, but requires large arrays of detectors of great uniformity and reliability.

(U) DISCOID-type systems are of relatively recent origin. They rely upon a number of detectors to scan the field of view serially, each one of the detectors covering the total scene. The integrating delay sums the signal for each of the detectors from the same target point. This increases the signal-to-noise ratio and eliminates the need for very large and uniform arrays. Failure of one or several detectors affects system performance only slightly, provided the inoperative detectors do not generate excessive noise.

(U) While the DISCOID system does not require the large and uniform arrays of the parallel-scan type, it does require very high-speed rotating mirrors for image dissection. Depending upon total field of view and other parameters, 20,000 to 70,000 RPM may be required. The DISCOID system also is better suited to remote, indirect TV display. Another advantage of DISCOID over parallel-scan systems is that DISCOID systems are more easily and effectively equipped with cold shields, which serve to reduce background radiation.

(U) In spite of the multiplicity of FLIR prototypes, much of the tactical use of FLIRs in Vietnam can be covered by considering three weapon programs. These are: the Air Force Gunship, the Army UH-1 helicopter, and the Marine Corps YOV-10D.

2.1.2.1 The Air Force Gunship Program

(C) The Air Force gunships were the C-119, the AC-130, and the AC-130F. The FLIR equipments used on these were the AN/AAD-4, used originally on the C-119, and the AN/AAD-6 and AN/AAD-7 which were developed from the AN/AAD-4, and which were used on the AC-130 and AC-130F. The Army FLIRs were the AN/AAS-29 and the AN/AAQ-5, for the UH-1 helicopter. In the following, the AN/AAD-4 will be discussed as typical of the helicopter application. The Marine Corps FLIR subsystem was developed in 1970 for the Night Observation Gunship (NOGS); the hardware was installed and tested in the Marine Corps YOV-10D aircraft. The system used the same FLIR sensor and signal processing electronics which had been designed and developed for the Passive Infrared Night Equipment (PINE) for the Army Cheyenne helicopter. The same components were later used in the Electro-optical Viewing System (EVS) FLIR for the Air Force B-52 aircraft.

(S) A prototype AAD-4 FLIR was installed in an AC-130, Gunship II, in the spring of 1967.[24] Gunship II was a converted C-130. It had eight fixed guns mounted to fire to the left of the aircraft, the FLIR, a light-intensification night-observation device, a Xenon illuminator, and a beacon tracking radar, and was designed to have a covert night attack capability. In tests at Eglin AFB and subsequently in Southeast Asia, the FLIR proved to be a key element in the Gunship's success.

(S) In initial operational tests of Gunship II, detection range on trucks was well in excess of 6000 feet. This range was achieved in part because of the flight path of the aircraft. Gunship II usually orbited a segment of road or flew parallel to it at only 145 knots. The success of Gunship II led to a program for a family of AC-119G, AC-119K, and AC-130 Gunships. (Tests in CONUS of improved versions of the FLIR yielded typical vehicle detection ranges on targets of opportunity on the order of 20,000 to 30,000 feet. Detection of carefully controlled target trucks occurred at slant ranges which varied from about 5,000 to about 14,000 feet.)[25]

(S) The Gunship mode of attack is to circle the target at a constant altitude to deliver intense fire power. The fixed side-firing gun is aimed by the pilot who adjusts the flight path of the aircraft with the aid of a special display. Enemy ground gunners had a great deal of difficulty hitting the circling Gunship because it was not flying straight and level. The System had an extremely small CEP, and a very high probability of inflicting damage.

(S) The AC-130 Gunship was perhaps the most effective weapon system employed in the night interdiction role. Although in the later versions ignition sensors (Black Crow) and LLLTV were of value, the best sensor overall was the FLIR, because of its combination of good pointing accuracy and independence of ambient light conditions. The capability of both the infrared sensor and the night observation device to find landmarks and targets without the aid of flares was valuable. Ground commanders could request fire to be delivered at a certain landmark without the gunship having to reveal its location. This fire could then be adjusted to the desired locating using information radioed from the ground.

2.1.2.2 The Army UH-1 Helicopter System

(S) The AN/AAQ-5 FLIR was designed to mount in the UH-1M helicopter as a night surveillance and fire-control sensor. The AN/AAQ-5 operates in the 8 to 13 μm spectral region. It has a dual-field optical system which allows the operator to select either a 5 × 7.5 degree field with 0.25 milliradian resolution or a 20 × 30 degree field with 1 milliradian resolution. It has a minimum resolvable temperature difference of about 0.3 K in the narrow field and about 0.2 K in the wide field.[26] During field tests at Aberdeen Proving Grounds, 2-1/2 ton trucks were detected at average ranges of 4000 m and personnel at ranges of 2000 m.[26,27] (50 percent probability of detection). These ranges are highly dependent on atmospheric conditions and target strengths.

(S) In combat evaluations in Vietnam, the AN/AAQ-5 demonstrated excellent performance. The average combat operational altitudes for the FLIR system was 1350 ft above ground level against vehicles, and 1770 ft above ground level against personnel. The FLIR equipment had the ability to operate through about a 200 to 300 ft thickness of clouds. At times, the aircraft could be operated by contact flying along canals seen on the display when visual observation was obscured by the clouds. On several occasions, the FLIR was able to see through 200 to 300 ft thick layers of ground fog and to engage enemy targets. However, the FLIR was ineffective during heavy rain.[26]

2.1.2.3 The YOV-10D FLIR

(S) The YOV-10D night Observation/Gunship system was developed to accomplish the missions of[28]

Observation and surveillance
Night sensor reconnaissance
Helicopter excort
Tactical air coordination
Target marking
Gunfire adjustment
Target interdiction
Utility

against the Viet Cong's use of the cover of darkness for both tactical and logistics operations. The aircraft is a slightly modified version of the OV-10A Bronco. The primary armament is a flexible turret-mounted 20 mm cannon, and the FLIR sensor is used for night observation. In one service test system, a neodymium YAG laser target designator was combined with the FLIR sensor.[28]

(S) The FLIR had a dual field of view of 5 × 6.7 degrees or 15 × 20 degrees, a resolution of 0.25 or 0.75 milliradians, a frame rate of 30 per second, and a minimum resolvable temperature difference of 0.8 K.[29,30] Although designed primarily to provide night operations, the FLIR provides various degrees of vision through camouflage, dust, smoke, haze, and light fog that would severely limit visual operation. The FLIR can be used for navigation, terrain avoidance, terrain surveillance, target detection, target recognition, target tracking, gun laying, and aid in landing.[28] The sensor has three modes of operation: navigation, track, and fixed forward. In navigation, the sensor remains fixed at a selected angle, stabilized against unwanted aircraft motion. In track, the sensor is slewed by a rate-control stick; computer-aided tracking is also available. In fixed forward, the sensor is locked at zero-azimuth at a sele selected depression angle.[28,29]

(S) Tests at Camp Pendleton indicated that the optimum conditions for target detection were at altitudes between 2000 and 3000 feet at speeds of 150 to 160 knots at ranges outside effective small arms fire. The system can fire on straight passes directly over or to the side. If it is desirable to bring continuous fire to bear, an orbital pattern allows side firing with damage assessment.[30] In Vietnam, because of heavier cover and better target concealment, the search altitude was dropped to between 2000 and 2500 feet, and the orbital pattern was employed most of the time.[28] Generally, in the delta region, because of the rules of engagement employed there, two aircraft were used to attack a target.

(S) In CONUS evaluation tests, it was concluded that the use of a FLIR in conjunction with a flexible gun was feasible and had a high potential payoff, that a simple IFF device would be desirable, and that the FLIR can be used to adjust gunfire.[30]

(S) In Vietnam performance tests under combat conditions, the system was effective. On two occasions the enemy was repelled and killed within 30 meters of friendly forces. After the YOV-10Ds had operated in-country for a while, the enemy began to realize that it was no longer safe to move freely at night. Whenever an OV-10 orbited around him, he immediately dived for cover.[28]

2.2 GROUND INFRARED SENSORS

(U) Ground infrared sensors were under development during the Vietnam war but saw only limited testing in the field. To give an idea of their capabilities, the following Section 2.2.1 is taken directly from Reference 26.

2.2.1 Appendix: Use of Thermal Imaging Devices on the Ground

(S) "The Surveillance Set, Infrared, AN/VAS-1, commonly referred to as the Far Infrared Target Indicator (FIRTI), was tested at Project MASSTER, Ft Hood, Texas during the period from May 4 to May 12, 1970. The FIRTI clearly outperformed the standard M-60 tank night fire-control system, which uses a 2.2-kw infrared searchlight and gunner's M-32 night vision periscope (S-1 image intensifier). It was also significantly better than the stabilized night sight on the M-48 tank, which consists of a gated 60- to 18-mm zoom intensifier and gallium arsenide laser illuminator. The MASSTER report* concluded that

> In the opinion of the professional tankers at Ft Hood, the FIRTI provides a major advance in the capability to kill tank targets at ranges in excess of one kilometer. The demonstrated capability of the FIRTI system to apply rapid BOT (burst on target) and to operate covertly gives it a distinct operational advantage over the SNS system. The capability of the FIRTI to deliver second and third rounds in a minimum amount of time is most significant to tank survivability in a combat situation

The superiority of FIRTI over the other tank fire-control systems is due to a large extent to its ability to detect targets having low visual contrast. The FIRTI also enables the gunner to see the flight of the projectile by sensing the tracer element through the muzzle blast, smoke, and dust kicked up in front of the tank, whereas in most cases the first round cannot be sensed when the viewing is done with the image intensified.

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*(U) "Comparison of the Far Infrared Target Indicator (FIRTI) and the Stabilized Night Sight (SNS) on the M-48 A3 Tank," Test Report, Hqs, US Army Project Mobile Army Sensor Systems Test Evaluation and Review Activity (MASSTER), Fort Hood, Texas, July 1, 1970 (CONFIDENTIAL)

(S) "The Viewer, Infrared, AN/PAS-7, commonly called the hand-held thermal viewer, was well-received during STANO (Surveillance, Target Acquisition and Night Operations) testing at Fort Bragg and by Project MASSTER at Fort Hood. Six AN/PAS-7-infrared viewers were evaluated by the Army Concept Tem in Vietnam during the period from April 1 through June 30, 1970, with the evaluation being conducted by the 25th Infantry Division, which generally operated along the Cambodian border. The interim report rendered by the Army Concept Team in Vietnam* concludes that the AN/PAS-7 is suitable for employment in the Republic of Vietnam. The report also states that

> The AN/PAS-7 was employed frequently with other passive night vision devices, such as the AN/PVS-2 (Starlight Scope), PVS-3 (Miniscope), and AN/TVS-4 (Night Observation Device, Medium Range). Operators unanimously preferred the AN/PAS-7 over the other devices. The difference in performance was particularly evident under poor ambient light conditions.

The following incident* serves to illustrate the above statements:

> At approximately 1004 5 April, 1970, C Company, 1st Battalion (Mechanized) 5th Infantry was occupying a night defensive position in Tay Ninh Province. The company commander, using the viewer, detected 3 NVA approximately 200 meters in front of the company's position. The commander transferred the viewer to the regular operator and then used a Starlight Scope. The company commander could not observe any activity using the Starlight Scope; however, the viewer operator identified 14 NVA approximately 125 meters from the company's position. The company commander ordered the entire company to take up defensive positions and engaged the enemy. Their fire was immediately answered by Rocket Propelled Grenade (RPG) fire around the entire company position. It was estimated that 30 to 40 NVA has been engaged. Final results of this action: 2 U.S. KIA, 6 U.S. WIA; 12 NVA KIA, 1 RPG launcher and 12 RPG rounds captured. The company commander stated to the ACTIV project officer that without the viewer the company would have suffered greater casualties."

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*(U) "Interim Report: Evaluation of the Infrared Viewer (AN/PAS-7)," letter AVIB-GCD, DA Amry Concept Team in Vietnam (ACTIV), August 10, 1970. (CONFIDENTIAL)

3 PERSONNEL DETECTORS (SNIFFERS)[31-39]

(C) Personnel detectors, or commonly called people sniffers, are a class of equipments which were developed (between 1963 and 1969) explicitly as a response to Vietnam conflict requirements. All of these devices are based on a technique for detecting and counting condensation nuclei. Condensation nuclei can be detected by humidifying the air sample, then expanding it adiabatically so that water condenses around the nuclei, and measuring the sample density through light scattering from a controlled source. The condensation nuclei being sensed can be generated by man-made processes such as vehicle exhausts, campfires, cigarette smoke, etc; thus the presence of human beings can be detected through sensing condensation nuclei generated by people activities. Another technique that was incorporated in the early equipments was based on the use of converter devices which were intended to change the input gases (such as ammonia or other effluents) into condensation nuclei which were subsequently detected by the condensation nuclei detectors. Although the latter technique was responsible for the devices being called people sniffers, the most reliable sensing method turned out to be the sensing of human activity (fires, exhaust generated condensation nuclei.

(C) Historically, ambush detection was the Vietnam conflict requirement that stimulated the first personnel detector demonstrations. These grew out of the ambush detection program being carried out at the U.S. Army Limited War Laboratory (LWL) with General Electric Company as their contractor. The initial device, which was called the Manpacked Personnel Detector (MPD), was based on the converter principle and was designed to be carried on a man's back (19 inches long, 14 inches wide, six inches deep and weighing 23 pounds) attached to the standard lightweight rucksack frame. The air sample was collected by a detached probe which could be carried forward of the man and thus hopefully be deployed away from the operators generated effluents. This device was initially demonstrated to MACV personnel by a team from the LWL during August of 1965. Following the demonstration COMUSMACV requested that 200 of the items be brought into Vietnam for operational evaluation.[32,33]

(C) In December 1965 a U.S. Army Mobile Training Team (MTT) was formed and sent to Vietnam to train selected U.S. military personnel and others as instructors for the Personnel Detector (E63).[32,34] The training was completed by June 1966 and included personnel from the 1st Infantry Division, the 25 Infantry Division, the 1st Cavalry Division, the 101st Airborne Division, the 173 Airbonre Brigade, the 5th Special Forces Group, and the 1st Logistical Command. Numerous difficulties were encountered during this training program primarily attributed to

- difficulties in selecting proper exercise sites to best demonstrate the equipment capability (i.e., the ability to detect personnel upwind of itself)[34,35]
- engineering deficiencies and maintenance problems[34,35]

(C) Concurrently, the Army Concept Team in Vietnam (ACTIV) was directed to conduct a 120-day evaluation commencing in December 1966 at which time the MPD equipment was distributed to the following units.[32]

Unit	Quantity
1st Cavalry Division	30
1st Brigade, 101st Airborne Division	15
25th Infantry Division	30
1st Infantry Division	32
173rd Airborne Brigade	13
5th Special Forces Group	10
III Marine Amphibious Force	34
1st Logistical Command	17

(C) This evaluation lasted till May 1967 and the results were rather disappointing.[32,33] The ACTIV report concludes that "the MPD was of negligible value to the tactical troops in Vietnam" and recommended that it "should not be adopted for employment in Vietnam."

(C) In February 1967, however, it was decided to employ the MPD in a different role to determine its utility in an airborne mode. Under G3 USARV sponsorship the MPD was modified for employment in the airborne role and it was referred to as the Airborne Manpacked Personnel Detector (AMPD). All MPD's were transferred to USARV control for retrofit and issued to tactical units. The AMPD modifications "included lengthening the probe to permit its being remotely located outside the airborne vehicle and removing the output devices from the probe and installing them inside the airborne vehicle"[37]. In some units modifications were also made to receive power from the aircraft power supply, thus reducing the MPD weight by about 10 pounds. As of October 1967, 74AMPDs were made available to the following units.

Unit	Quantity
1st Cavalry Division	16
1st Infantry Division	10
25th Infantry Division	10
4th Infantry Division	9
9th Infantry Division	8
1st Aviation Brigade	8
11th Armored Cavalry Regiment	4
Americal Division	3
173rd Airborne Brigade	3
199th Infantry Brigade (Lt)	3

(C) The AMPDs in all instances of their employment were controlled at echelons above battalion and were used for detecting both point and area targets. Each unit used somewhat different employment techniques. However the "following procedure is considered to be representative of their use. A minimum of two helicopters were employed, a sensor aircraft and a position locator aircraft. The sensor ship flew at tree top height followed by the locator ship at a higher altitude. When a positive sensing was made the location was noted and forwarded through intelligence channels for further analysis. The area was then either raked by artillery or gunships, or possibly was swept by airmobile forces."[33] In most instances two sensors were mounted on a single aircraft to attempt to provide enough redundancy for more valid detections.

(C) Considerable amount of reports during this evaluation phase of the AMPD were very favorable, although it was very difficult to obtain statistically valid data from the uncontrolled operational environment to conclusively establish operational reliability and intelligence validity. In many cases when detections were made, it was not possible to validate by other means the existence of the targets. Similarly there was no valid method available to determine missed targets which should have been sensed. Also from reading the literature it is not clear what were the effluents that were being detected; condensation nuclei from fires and exhausts or body effluents. Results from controlled experiments conducted by Edgewood Arsenal personnel in Florida indicate that probably it was condensation nuclei that were being detected even when the converter devices were used with the equipment.

(C) The final versions of the personnel detector equipment fielded in Vietnam were the prototype Airborne Personnel Detector (APD) and the operational XM3 Personnel Detector[38,39] delivered in Vietnam in 1969. The XM3 Detector consists of two identical condensation nuclei detector modules with a two channel, strip chart recorder to provide an instantenous display of the module responses. It was generally mounted in UH-1 type helicopters with the air scoop in the chin bubble and the detector assembly mounted in the cargo deck.

(C) The recommended[39] organizational procedure was to assign such resources to the chemical section of divisions, separate brigades and field forces with the G2/S2 exercising primary staff responsibility and operational control.

(C) The following recommended employment technique is extracted from References 38 and 39:

1. A minimum of three helicopters are required and are employed as follows:

a. One UH-1 helicopter (detector ship) carries the personnel detector, detector operators, and an observer. This helicopter flies at tree-top level, no more than 50 feet above the vegetation. The door gunners and observers should be equipped with smoke grenades for marking to assist in plotting the detections and marking detected targets for artillery fire, air strikes, or gunships.

b. One gunship flies 50 meters behind and slightly higher than the detector ship. This ship provides fire support cover for the detector ship.

c. One gunship flies behind the detector ship and at an altitude of 500 to 1000 feet. The pilot and co-pilot of this ship act as the navigator for the detector ship, plot detections as they are called out by the detector operator, act as a radio relay to the supported unit and/or the reaction force, and provide additional cover if the detector ship is fired upon.

4 ELECTROOPTICAL SYSTEMS

4.1 AIRBORNE LOW LIGHT LEVEL SYSTEMS

(U) Airborne Low Light Level (LLL) Systems use the visible spectral region, and employ image intensification techniques. This allows operation under low ambient illumination levels (down to starlight) or with moderate amounts of artificial illumination. This artificial illumination may be filtered to reduce its visible content since some photocathodes respond to radiation in the red region somewhat beyond the spectral range of the eye.

(U) Image intensification may be used either in direct view devices, or in log light level television (LLLTV) systems. The former yield somewhat simpler systems; some image relaying is possible using fiber optics. The LLLTV systems allow more flexible installations and indirect viewing.

(C) Success in locating the enemy through the use on the ground of image intensification devices was demonstrated relatively early in Vietnam by starlight scopes, night-observation devices, and LLLTV.[40] The requirement for an airborne device capable of detecting man-sized targets under poor visibility conditions resulted in the development of several systems over a period of time.

(C) One of the first of these was Project Eyeglass, a passive image intensifier system. This was essentially a night observation device on a stabilized mount. Although this was successful for helicopter night observations, it was limited in range, and since it was passive it could only detect under light levels above starlight. Subsequent systems included the Night-Vision Aerial Surveillance System (NVASS) or AN/ASQ-127, the Cobra Night Fire Control System (CNFCS), the Night Hawk System, and the Iroquois Night Fighter and Night Tracker (INFANT).

(C) The AN/ASQ-127 was one of the first large integrated night vision systems.[41] It utilized a gated, high-resolution optical sensor using a 60 mm image intensifier, high-speed, high-voltage gating circuitry, a synchronized, pulsed, solid-state illuminating source, a 200 W capacity cryogenic cooler, a ruby laser designator and ranger, a target location computer and readout, and high-resolution, high efficiency optical subsystems. The gallium arsenide illuminator operated in the near infrared, making the system covert in operation except when designating with the narrow-beam ruby laser. In order to reduce the noise caused by backscatter of radiation from the illuminator, a gating system was used in which the illuminator is pulsed, and thre receiving sensor is turned on when reflected energy from targets at a chosen range is returned. This system was apparently not given operational tests in Vietnam.

(C) The CNFCS XM-136 low light level fire control system was a LLLTV camera with a reticle integrated with the lead angle computer in the daytime XM-28 Sighting Stations, combined with a TV cockpit display for the copilot/gunner.[1] It was capable of detecting tank-type targets at 2000 meters under overcast starlight conditions. It had a 15 degree field of view, and unit magnification. The LLLTV camera sensor was mounted on a gimbaled platform in an M-5 turret with an eight-inch TV remote display mounted in the windshield canopy for the gunner. A covert illuminator was slaved to the sensor for active use. This arrangement permitted the SM28 Armament Subsystem to be employed in a normal daytime fashion, but under low light level conditions.

(C) The NIGHTHAWK system consists of an AN/TVS-4 LLLTV sensor and an AN/USS-3 searchlight mounted on a UH-1. This system was tested in Vietnam. It has the disadvantage that the aircraft doors had to remain open, making it difficult for the crews to function in cold weather. It was found that the system served as a highly effective economy-of-force measure in the 1st Cavalry Division in RVN in those areas that were not covered by ground maneuver or surveillance units. The system was effectively employed along known infiltration routes and avenues of approach in the 1st Cavalry Division. It was targeted against likely assembly areas, cache sites, and known enemy locations. Mission assignments were made by brigades, division artillery, or division, depending on current intelligence and the availability of other surveillance means. The system was considered one of the most effective 1st Infantry Division night assets in RVN, and was used by the TDS to respond to fleeting targets acquired by other intelligence sources.[2]

(S) The INFANT (AN/ASQ-132) night vision image intensifier system consisted of two passive, stabilized image intensifier sensors mounted on a [illegible] helicopter equipped with the M-21 weapons system.[1,26] Both a [illegible] (LLLTV) and a Direct view sensor were provided. Both sensors use [illegible] intensifier tubes. The remote view sensor had a field of view ranging from 18 × 24 degrees to 6 × 8 degrees. The direct view sensor had a step-wise variable field of view ranging from 20 degrees to 6 degrees. Both sensors are aimed by the rotation of mirrors. Imagery from the remote view sensors is displayed on separate eight-inch television monitors provided for the pilot and copilot, and a 12-inch display is located in the rear cabin. The direct view sensor is available for the copilot/gunner through the use of a fiber optics cable. Supplemental illumination is provided by two weapon-mounted 500-watt Xenon pink filter searchlights.

Operational Evaluation

(S) INFANT was tested at Aberdeen and combat evaluation of INFANT was conducted by the Army Concept Team in Vietnam during the period from November 26, 1969 through February 24, 1970. Prior to testing, it was calculated that the direct view sensor would yield detector ranges against vehicles on roads of 2.5 to 3.0 km in moonlight or 1.5 to 2.0 km in starlight (wide field of view) or recognition ranges against vehicles on roads of 1.3 to 1.8 km in moonlight or 0.8 to 1.2 km in starlight (narrow field of view). These predictions were largely borne out by the Aberdeen tests. In these tests, the auxiliary illuminators provided little or no increase in range, almost certainly due to backscatter.[26]

(S) In the combat evaluation in Vietnam, INFANT was found to do an excellent job, although not as good as the AN/AAQ-5 FLIR which was tested under similar conditions. The average INFANT operational altitude was about 800 feet, somewhat lower than required by the FLIR. The INFANT system did not have the FLIR capability of penetrating fog or cloud.[26]

(C) The following notes represent INFANT performance in Vietnam. Over a 3-day period, the INFANT was credited with 10 KBA's in a combat evaluation of the INFANT operating in support of the 25th Infantry

Division in January 1970. The system was employed over a triple canopy jungle and over open rice paddies. INFANT-equipped aircraft were very effective in detecting and engaging targets at night. It was reported that during a 5-week period one aircraft killed 61 NVA soldiers, destroyed two machine guns, one truck, and two sampans. This evaluation was made in the 1st Cavalry Division in November and December of 1969.[2]

4.2 GROUND BASED NIGHT VISION DEVICES

(C) A family of direct view, low light level devices has been developed by the US Army Electronics Command Night Vision Laboratories. These low light level devices respond to visible light and require some ambient illumination (on the order of starlight) to function. Several of these were employed in Vietnam. In general, these used so-called first generation image tubes, composed of three fiber optics coupled converter tubes deriving their gain from electron acceleration, and focused electrostatically.[42]

(C) Three of these devices are of principal interest, the Small Starlight Scope, the Crew Served Weapons Sight, and the Night Observation Device.[42] The Small Starlight Scope is designed to perform as a hand-held or individual weapon-mounted night telescope. The device has 4× magnification, a 10.5° field of view, and weighs about 6 pounds. It uses a 25 mm diameter image tube. The Crew Served Weapons Sight employs the same size image intensifier tube. It has a 7× magnification and a field of view of 5.6°. It weighs about 16 pounds. This sight is adaptable to various machine guns and recoilless rifles. The Night Observation Device is a man-portable tripod-mounted system generally used in the field by personnel on outposts, listening posts, and forward observation posts. It has, in many areas, become an important part of base perimeter defenses. The system weighs about 34 pounds without the field model tripod and about 43 pounds with the tripod. It has a 7× magnification and a 9° field of view, and can be focused from 50 meters to infinity. This device uses a 40 mm diameter image intensifier tube.

(C) A comparison of the performance of the Starlight Scope and the Night Observation Device with the unaided eye is shown in Table 4.1. These data are the result of a detailed analysis[43] of an extensive field test of various nighttime sensors.[42]

TABLE 4.1 (C)

DETECTION AND RECOGNITION PERFORMANCE

SUMMARY OF VISUAL AIDS (U)

(Figures are detection and recognition ranges, and probabilities of detection and recognition.)

Target	Lighting	Unaided Eye	Starlight Scope	Night Observation Device
Man	Moonlight	80 m $p > 0.5$	200 m $p > 0.9$	200 m $p > 0.98$
Man	Starlight	50 m $p > 0.2$	200 m $p > 0.8$	200 m $p > 0.9$
Truck	Moonlight	200 m $p > 0.8$	800 m $p > 0.8$	800 m $p > 0.9$
Truck	Starlight	200 m $p > 0.4$	800 m $p > 0.7$	800 m $p > 0.9$

(U) In Vietnam, these devices were used extensively on both offensive and defensive operations. Many examples of their use are available; in the following paragraphs, some selected examples are given to indicate their mode of use and effectiveness.[40]

(C) The night of 7 January 1966 a Special Forces A detachment was using a Starlight Scope to detect Viet Cong actions close-in to their camp. They observed the VC preparing mortar positions and a command post north of their compound. These positions were cleverly concealed and were constructed to make them impervious to counter-mortar fires. The Special Forces personnel continued to observe the VE construction unit every night until the positions were completed. The following day a demolitions patrol was sent out and destroyed the emplacements before they could be used.

(C) On 15 March 1966 an element of the 173d Airborne Brigade in War Zone "D" had an observation post as part of its perimeter. At 0100 hours, the observer while using a Starlight Scope spotted a six-man Viet Cong patrol moving along a ridge line. Using the scope, the operator adjusted artillery fire on the target area and, when the fire mission was completed, was able to observe the six bodies on the ground.

(C) For six consecutive nights from 23 to 28 March 1966, the Viet Cong probed and attempted to infiltrate the command post area of the 1st Battalion, 5th Cavalry, 1st Cavalry Division while they were providing security along Highway 19. Each time they were detected by the operators of three Starlight Scopes located at outposts manned by the Reconnaissance Platoon. By calling for illumination and mortar support, and by marking the target area with tracer rounds, enough firepower was placed on the VC to repel their attempts.

(C) In February 1967, D Troop, 17th Cavalry, 199th Light Infantry Brigade sent out two platoon-size ambushes along the Dong Nai River. The Starlight Scope observers were able to observe a total of six Viet Cong sampans during the night. All six were engaged by the ambushes resulting in the destruction of the sampans.

(C) A Crew Served Weapons Night Vision Sight was used in conjunction with the AN-PPS-4 short range radar by the 3d Brigade, 1st Infantry Division. The radar set and the device were placed in a tower seventy-five feet high to observe the road from Lai Khe to Ben Cat. The device was used to identify targets which had been located by the radar. Whenever activity was detected, artillery fire was placed on this location.

5 UNATTENDED GROUND SENSORS (UGS)

5.1 BACKGROUND

(U) The unattended ground sensor technology was developed in the 1960's totally in response to the requirements of guerrilla warfare and the Southeast Asia conflict. The nature of guerrilla warfare which is characterized by the ability of the enemy to move essentially at will both in space and time over large expanses of variable and difficult terrains, calls for some means to discover and hopefully track the enemy before he masses to attack usually fixed counterinsurgency force positions. Aerial surveillance can be of considerable help in this matter if it were not for the abundant vegetation of Southeast Asia. Proposals to "bug the jungle" started arriving in ARPA early in 1962-1964, but most proposed techniques (acoustic, seismic, magnetic, trip-wire, etc) were characterized by short detection ranges(order of meters). Perhaps the missing element (for matching these techniques to the tactical problem) was the realization that such short sensing ranges could be useful. It was clear that operational advantages could be gained by simple and obvious innovations, such as a radio link and data storage, both of which were proposed in 1965 by General Research Corporation (then Defense Research Corporation) in a study for ARPA.[44,45,46] The proposed concept helped to support work undertaken at Sandia for the development of a hand emplaced seismic sensor with both real time and storage-interrogation modes via VHF-AM radio links compatible with aircraft communications equipment.

(C) By April 1966, experimental prototypes of the Sandia Seismic Sensor were available and were being tested under CINPAC sponsorship in Thailand. The application envisioned for the system was a means for monitoring truck traffic along the Ho Chi Minh Trail. It was determined in these tests that the seismic technique, although limited by background noise, was better for this purpose than other systems.

(S) In the summer of 1966, the problem of infiltration through the great maze of roads and trails in the Ho Chi Minh Trail became a problem of significant concern. The problem was being addressed by two groups: the IDA JASON Group and a separate group in Cambridge, Mass., who had the support of Secretary McNamara. The major written report on this subject is IDA S-255, entitled "Air-Supported Anti-Infiltration Barrier" which propsed a barrier detection system based primarily on acoustic techniques (based on improvements of the Navy acoustic sonobuoys) to detect signatures from "button bomblets" stepped upon by walking personnel, or the sounds of moving trucks. During the latter part of August and the early part of September 1966, this concept was accepted by Secretary McNamara.[47]

(C) This approval resulted in the formation of Task Force 728 (Defense Communications Planning Group) with the mission to develop and deploy the anti-infiltration system in Southeast Asia. The charter for the formation of this group carried a set of unique authorities:[48] (1) immediate access to the Secretary of Defense for broad policy decisions, (2) adequate funding to meet the mission objectives. and (3) the right to make mistakes. It was this group with this unparalleled charter that launched the increased R&D effort which developed the multitude of sensor devices and systems which came to be known as "unattended ground sensors".

5.2 GROUND SENSOR TYPES[1,46,49,50,51]

(U) Since the sensor development activities of DCPG, ARPA and the services was extensive and properly funded, a great variety of sensors was developed with a multitude of acronyms and differences in characteristics. These differences are not attributable to the basic detection techniques; rather they deal with signal and data processing, memory and information storage, data links, command links, packaging, deployment means, power requirements, expendability etc. We will address the subject in this discussion by sensing techniques and within each technique we will point out some of the main different equipment types, without being totally exhaustive for the sake of brevity.

5.2.1 Acoustic Sensors

(C) As mentioned earlier acoustic sensors were the main sensors proposed in the IDA-JASON study. They were inspired by the Navy Sono-bouy; the hydrophone was replaced by a microphone, a long life battery was added, the device was provided with a parachute that could catch in the jungle canopy and the name was changed, to ACOUBUOY. Some later versions feature a plastic spike which was added to permit implantation in the ground where no canopy existed and the soil had appropriate characteristics; this device was named the SPIKEBOUY. Other device types are (1) the ACOUSID II and III which are combination seismic and acoustic sensors, where the detection is normally made with the seismic sensor and audio can be requested upon command, (2) COMMIKE III which is another commandable microphone device delivered by fixed wing aircraft or helicopter. All other acoustic devices are delivered by high speed aircraft and they are expendable.

(C) Microphones are omnidirectional and several signal processing techniques have been incorporated.

- primarily for track detection, early devices were equipped with a simple logic which registered a detection when the sound pressure level exceeded the background by 6 db for at least 2 seconds. These devices detected trucks in quiet jungles at ranges of 300 - 500 m.

- later ACOUBOUY's were equipped with a line spectrum detector (LSD), which detects and discriminates piston engines from other noise sources by sensing characteristic harmonic lines.

- for personnel detection the early ACOUBOUY's were equipped with appropriate circuitry to detect the sharp, fast rising sound of the button bomblets. For many reasons, however, button bomblets were not deployed since they are difficult to produce, store and dispense and seismic and other sensor technology obviated the use of BB's for personnel detection.

- straight audio transmission, which resulted in many actual tape recordings of enemy troops talking.

5.2.2 Seismic Sensors

(C) The first air deliverable sensor developed was the ADSID (Air Deliverable Seismic Intrusion Detector). This sensor was an air-deliverable version of the SID (Seismic Intrusion Detector) which SANDIA had started developing for ARPA prior to DCPG days. The logic of the ADSID was much simpler than the earlier SID primarily since the ADSID did not have any store and interogate capability. This device was concealed by essentially complete burial and had a 45 day battery life, and could survive the air delivery impact shock. It was designed to be delivered from wing racks on the OP-2E aircraft but has been successfully used with the F-4 and CH-3. This device had no parachute and was designed to implant in the ground leaving the vertical antenna and ground plane showing.

(C) All seismic sensors utilize vertical axis geophones which sense the wave produced by rolling vehicles or walking men. The detection ranges are about 30 meters for walking men and 300 meters for moving vehicles. The ranges vary considerably with soil conditions. False alarm can be created by physical elements such as rain, wind, animals, etc., or by other sources such as overflying aircraft, weapon firings, bomb explosions etc. There exist several detection schemes for optimizing detection and discrimination in the presence of false alarms and unwanted targets (tanks vs trucks etc). The original sensors used fixed threshold detection which was set manually prior to emplacement; for example if the threshold was exceeded four times in a six second period a detection is called. Other detection schemes utilize

- pulse length and repetition rate characteristics
- adaptive thresholding (to vary with the average level of the background noise)
- harmonic content of signal

(C) There is a great variety of seismic sensors which vary in detection logic, method of deployment, weight, packaging, etc. Some of the most common types are:

- ADSID/short; weighs 13 pounds and is 20 inches long vs 25 pounds and 31 inches for the ADSID, it can be dropped from helicopters flying as low as 100 ft.
- ACOUSID; longer version of ADSID incorporates an acoustic module to transmit audio information when seismic detection occurs. It also has a detachable afterbody, or DAFT, where the base plate antenna and microphone stay above ground while the remaining package penetrates deeper.
- MODS; a mortar delivered sensor for 81 mm mortars
- FADSID; air deliverable sensor for high speed aircraft
- HELOSID; helicopter delivered sensor
- HANDSID; original hand emplaced sensor, weighing 17 pounds in 800 cubic inches
- MINISID; later version of the hand emplaced version weighing 9 pounds in 400 cubic inches
- MICROSID; weighs less than 5 pounds is 55 cubic inches.
- DSID; a later version of small hand emplaced sensor
- PSID; this is a small self-contained system for use by patrols. The set consists of 4 sensor/transmitter units and one receiver/monitor unit. The geophone is detachable for each sensor and can be deployed up to C feet away from the transmitting package.

5.2.3 Magnetic

(C) Magnetic detectors operate by sensing the presence of metal (vehicles, weapons, etc.). In general, the presence of metal disturbes a magnetic field and the change is detected. The first design was essentially a large search coil with a high gain, low noise amplifier, which measures the rate-of-change of the magnetic flux caused by the movement of the metal in the coil field. People armed with rifles can be detected this way at ranges of 5-12 feet. Actually to reduce false alarms two search coils are deployed in a gradiometer arrangement. This type of device has been termed the MAGID. Hand employing and burying the cables is rather ackward but operational results in detecting rifles with low false alarm rates have been good. This type of sensors can be slaved to other sensors (seismic) to confirm a detection or to determine if the intruders detected are carrying metal materials.

(C) Other magnetic sensor development has concentrated in the use of magnetometers of the thin film and the flux gate varieties.

(C) The main devices are the MAGID T3, the MAGID T4, and the MAGID III, containing improvements in the order listed. They are to be used in conjunction with compatible hand emplaced seismic devices (HANDSID, MINISID).

5.2.4 Infrared

(C) Infrared devices work on two basic principles; the breaking of an infrared beam between a transmitter and a receiver placed on either side of a tail or the use of thermopiles on one side of the trail to detect IR energy in the 8-15 micron range. Useful devices use the second principle primarily for ease of deployment; they are the PIRID (Passive IR Intrusion Detector) and the DIRID (Directional IR Intrusion Detector). More than one field can be checked with devices of this type to reduce false alarms. Ranges of effectiveness (assuming that a line of sight exists) are up to 50 ft for people targets. This device can also be used in conjunction with compatible seismic devices such as the HANDSID and the MINISID.

5.2.5 ARFBUOY/NBB

(S) As mentioned earlier, the originally proposed button-bomblets (BB's) were not deployed in conjunction with the ACOUBUOYs for a variety of reasons. Instead, a development effort was launched to produce a noiseless buttom bomblet (NBB) which emits an RF signal when it is stepped upon. The signal can then be picked up by a listening device deployed in the jungle canopy, which analyzes the signal and transmits an appropriate ID. It is called the Automatic RF Buoy (ARFBUOY). The NBB's are designed so that they are well camouflaged as rocks, sticks, etc. They were designed for aerial deployment, and they have a lifetime of several hundred activations.

5.2.6 Other

(S) The EMID sensor is based on the electromagnetic principle of a super-regenerative oscillator. The EMID whip antenna is coupled to a resonate tuned tank circuit at the output of an oscillator. A disturbance in the near field of the antenna, such as motion of a person, detunes the oscillator tank circuit and generates a detectable signal. Detection ranges of 75-100 feet are possible. The PEMID is a patrol device interchangeable with the PSID, so that a mix of seismic and electromagnetic detectors can be monitored by the same PSID receiver.

(S) Another detector developed for Southeast Asia was the ignition detector (EDET); it was designed to detect radiation from poorly shielded truck ignition systems. The EDET was configured for air-drop and parachute hang-up, and was employed with some success in conjunction with commandable acoustic devices to confirm use of suspected convoy staging and refueling sites along the road network in Laos. Earlier versions of ignition detectors were affected by false alarms, apparently from distant lightning, but the EDET corrected some of this problem by use of proper circuit logic.

5.3 SENSOR COMMUNICATIONS

(C) The heart of the unattended sensor system was communications. Depending upon application, required distances from unattended sensors to remote monitoring stations varied from tens of meters for the patrol devices devices such as the PSID to several hundred kilometers in the Laos deployments. In most applications the rough terrain made the use of airborne or ground-based intermediate relays mandatory.

(C) The basic sensor data links evolved from a 31-channel VHP system (Phase I) to the narrow-band FM Phase III system which provides 640 channels in the 162-174 MHz VHF bond. Basic sensor messages were digital, 18 bits long, and transmitted at 300 bits per second. Thus, this narrow-band system which could accommodate up to 64 sensors on each channel operated with low spectrum occupancy in most applications and reduced vulnerability to ECM. A set of common modules were developed for use in the family of Phase III sensors, including the message encoder, VHF transmitter command decoder, command receiver, and code plug. The common modules used integrated circuits, were potted in plastic for shock resistance, and were mass produced in sufficient quantities to achieve cost benefits.

(C) The normal sensor transmission included a 6-bit address code unique to each sensor to permit unambiguous identification and display (or recording) of each sensor detection. This sensor ID was pre-set on code plugs to facilitate operational deployment of strings of sensors. Others of the common modules were utilized or not as required in particular sensor configurations. A special sensor assembly and checkout equipment was developed to test interconnected modules of each assembled sensor prior to delivery. This technique improved operational reliability of the sensors markedly.

(S) To monitor and to handle the long ranges between sensors, several types of relaying equipment were developed. In the Ho Chi Minh Trail applications EC-121 aircraft were properly equipped and deployed for this purpose. On the EC-121 the received sensor signals are sampled at 5,500 times per channel per second and transmitted at S-band frequencies (with a 1.8 megabit rate) to the ISC at Nahkon Phanom. On board the EC-121 the received signal from the APR-52A receiver was also used with appropriate Tell-Tale Unit decoders to display sensor activations for on-board monitoring purposes.

(S) Automatic data transmission is also accomplished by the Automatic Data Relay (ADR) equipment which operates at S-band. Other relay equipments were also developed and deployed for various applications. For example, to handle limited needs, the Sensor Analogue Relay System (SARS) was developed and fielded. It consists of an Airborne Relay Package (ARP), a Ground Relay Package (GRP), and the Terminal Package (TP) which can be used with either the ARP or the GRP. These relays utilize direct VHF to UHF translation at the relay and the signal is subsequently stepped down to VHF at the TP receiving end.

(S) In some cases elevated antennas were used instead of relays whenever the terrain allowed such deployments. Several isolated mountains in Central South Vietnam were utilized as relay locations, and in the delta area tethered balloon relay platforms were sometimes used.

(S) Receiving end and display equipment varied with the application from computer assisted displays at Nakhon Phanom to simple and tone coded procedures utilized in the PSID. Typical intermediate equipments are the Portatale (AN/USQ-42), the Portatale III (AN/USQ-46), the Situation Display (Map Display), and the Event Recorder (RO-376/USQ). The Portatale is used at front lines by forward observers, Company command posts and Battalion outpost levels, or in riverine applications they are carried on patrol boats. The same units can be deployed at higher levels but because of the distances involved elevated and higher gain antennas must be used. The Situation Display Unit allows the display of sensor activations on a map background for easier interpretation. The Event Recorder is used to record sensor activationsover a time period so that by pattern recognition the operator can differentiate false alarms from persistent activations caused by real targets traversing a sensor field.

5.4 OPERATIONAL APPLICATIONS [26,52,53,54,55,56]

5.4.1 IGLOO White

(S) The first major application of ground sensors was the result of Secretary McNamara's decision made on 15 September 1966 to develop and deploy such a system. As originally conceived the system consisted of three major parts: (1) a Strong Point/Obstacle Subsystem to be deployed in northeastern RVN, (2) an Air-Supported Anti-Personnel Subsystem to be deployed in northeastern RVN and eastern Laos, and (3) an Air-Supported Anti-Vehicular Subsystem to be deployed in central Laos.[56] This "anti-infiltration system per-se was never fielded. Segments of the infiltration surveillance system have been fielded and worked...while no one knows if the original concept as approved by Mr. McNamara would have ever worked in its entirety because it was never tried."* The Strong Point construction (DYE MARKER) was halted early and so it was never tested. Similarly, although by late January 1968 resources were available for the Anti-Personnel System (DUMP TRUCK) they were never fully fielded as such and were diverted for the siege of Khe Sanh operation (this application will be discussed later). The initial deployment of the Anti-Vehicular System took place in Mid-December 1967 (MUD RIVER). The total operation carried the code name MUSCLE SHOALS and was later changed to IGLOO WHITE while the deployment location was code named as the STEEL TIGER area.

*(U) Keynote address at "Sensor Symposium" delivered by LT. Gen. J.D. Lavelle.

(S) The anti-vehicular system consists of (1) strings of sensors deployment in the Laos road network, (2) a specially equipped EC-121 relay aircraft, and (3) a fixed ground station the Infiltration Surveillance Center (ISC) at Nakhon Phanom, Thailand. The functions of the ISC are:[51]

- Intelligence collection and interpretation
- Resource status and management
- Deployment planning
- Sensor data processing: data reception, and classification, sensor operational mode control, data distribution, target, detection and tracking
- Evaluation and analysis.

(S) The ISC was continuously updated and improved, and by 1969 it had two IBM 360/65 computers with the capability to collect, collate and process data from as many as 2000 sensors. This data is organized in CONFIRM (Coincidence Filtering Intelligence Reporting Medium) printouts of time versus sensor presentations of 40 minutes of sensor activation data and other related information such as sensor types, channel/tone code assignments, distance between sensors, etc. These reports, which in essence, summarize the number of activations per minute for each sensor are updated every five minutes and are forwarded to the Target Analysis Officers (TAO's). From the pattern of activation the TAO picks out potential targets which he tracks and develops. After targets are developed by the TAO the target information is passed to the intelligence section for correlation with other sources of information, and then is transmitted to the Airborne Command and Control Center (ACCC) for assignment to strike aircraft. Another important information assessment source is the Combat Information Monitor (CIM) who monitors the acoustic information from sensors, interprets the sounds and then inputs his assessments into the computer for inclusion in the CONFIRM reports as addition. information for the particular sensors.

(S) In typical operations during heavy truck movements there were about 400 active sensors organized into about 90 strings. Roughly 300 of these were ADSIDs, and about 100 acoustic devices and a mixture of other types. In terms of traffic being monitored, in "an average 24-hour period, 850 truck movements,each consisting of a convoy of 3 to 10 trucks moving past a sensor string, were detected, with more than 800 of the movements being detected at night."[51]

(S) Besides the ground sensors the total anti-infiltration operation utilized several other sensor systems:[55]

- Photo Reconnaissance (5,159)*
- Visual Reconnaissance (1,526)
- IR Reconnaissance (441)
- SLAR Reconnaissance (176)
- Weather Reconnaissance (220)
- Road Watch Teams
- Special Intelligence
- Human Intelligence

All these ancillary systems were used for area reconnaissance, target confirmation, strike planning, and other related operations, in the intelligence section of the ISC, and the ACCC.

5.4.2 Khe Sanh

(S) The Anti-Personnel system was scheduled for deployment in mid-January 1968. Actually, the first sensor patterns were dropped on 18 January 1968. However, with the Khe Sanh seige underway, General Westmoreland decided to divert the anti-personnel system resources to the Khe Sanh area. Almost immediately sensor patterns were deployed in the trails northwest of Khe Sanh. The sensors were monitored at the ISC after relay through a specially deployed EC-121. Although both seismic and acoustic type sensors were deployed,the seismics proved more useful due to false alarms from the acoustic interference of gunfire, aircraft strikes, artillery, etc.

*(U) The numbers in parentheses indicate the number of sorties flown in a particular operation (Commando Hunt III) as an indicator of the level of other reconnaissance activity.

(S) This original deployment depended on target information being relayed to the Marine targeting intelligence officer through the ISC. This procedure did not prove to be a useful method for developing targets. On the contrary, after the targeting intelligence officer became more familiar with sensor operation, he was then able to use the ISC targeting information not to identify targets but as an indicator of enemy activity in the area, and this way "the sensor fields became an intelligence and battlefield surveillance system (that) provided real-time information of a kind never before available to the battlefield commander."[56] This was even more true when later Microtale read-out devices became available for monitoring sensor activity from forward observer positions (whenever communication conditions permitted). This method of sensor use allowed for using the sensors again as targeting devices. All in all the use of MUSCLE SHOALS resources at Khe Sanh demonstrated the inherent flexibility of the system. Their utility is best described by a quote attributed to the Marine targeting intelligence officer at Khe Sanh." By knowing when and where to concentrate the artillery and air strikes, based on the use of sensor data with other intelligence, the enemy's reserve elements were completely neutralized."[51]

(S) This success at Khe Sanh and a subsequent use in the A Shau Valley prompted General Westmoreland to decide in the spring of 1968 that sensors should be introduced in South Vietnam ground troop operations for evaluation in ground combat.

5.4.3 South Vietnam Applications[26]

(S) General Westmoreland requested the Secretary of Defense to broaden the charter of DCPG to permit the agency to develop equipment to support Army, Navy, and Marine ground and riverine operations in Vietnam.[57] MACV followed this request by submitting a plan to the Joint Chiefs of Staff in April 1968 which called for the use of IGLOO WHITE and DUEL BLADE technology and assets in expanded applications against the enemy in Vietnam. This MACV

Plan was entitled DUCK BLIND.[26] This plan marked the beginning of large scale use of sensors in the battlefield. The plan was experimental in the sense that the doctrine and procedures had yet to be devised primarily by improvisation of people in the field. In the first phase of the DUCK BLIND program several units (shown in Table 5.1) were assigned the responsibility of evaluating sensor devices in particular tactical applications.

Table 5.1 (S)
DUCK BLIND Applications[58] (U)

Application	Responsibility
Combat Sweep	1 st Infantry Division
Convoy Protection	4 th Infantry Division
Targeting	1 st and 4 th Infantry Division
Ambush	5th SFGA and 9th Infantry Division
Enemy Base Area Surveillance	1st Infantry Division
Base Defense	25 th Infantry Division and 53 rd Signal Battalion

(S) The second phase of this plan scheduled to continue through December 1968 called for applying the experience gained in phase one in order to define future equipment requirements, develop sensor employment methods, and conduct training.

(S) The sensors deployed in this program were all Phase I sensors primarily designed for the IGLOO WHITE Program. They were: ADSID, HANDSID, ACOUBUOY/SPIKEBUOY, MAGID. Monitoring devices were the MICROTALE A and B

(TC-390) and were later replaced by the PORTATALE receivers (AN/USG-42) in 1969. Apparently the MICROTALE receivers proved unsatisfactory.[26]

(S) This program had several drawbacks that made the evaluation of the new technology rather difficult

- the sensors were not designed for ground operations (i.e., terra-brakes on ADSIDS failed to keep the devices from sinking in mud, 17 lb HANDSIDS and MICROTALES were too heavy for ambush patrols, waterproofing failures were common, etc.
- there was no established doctrine and operational procedures
- no attempt was made to educate commanders and staffs on the capabilities and limitations of the various devices
- personnel training was limited, only the 1st Infantry Division had a trained (16-man) sensor team because of their participation in the then ongoing TACSIV II (Target Acquisition and Surveillance in Vietnam/evaluation). Limited training for the other divisions was accomplished by New Equipment Training Teams (NETT).

(S) Consequently the results of this program were mixed and the evaluation report[26,58] did not offer a finding or conclusion on the overall value of UGS in support of ground operations.

(S) Most of the success during the evaluation period was experienced by the 1st Infantry Division (which had better training) although some spectacular results were accomplished by the 25th Infantry Division when they used the sensors to detect the enemy in hi. territory rather than in the passive role of base defense. The experience of the other units during the evaluation period was less than satisfactory, although, as time passed and people improvised and learned, the situation improved.

(S) In 15 October 1968 the program code name was changed to DUFFLE BAG. By now sensor equipment had undergone considerable redesign and development under the Phase II DCPG equipment program. The newer equipment had reduced weight, was more reliable and increased operational life. Typical devices incorporated into field operations during this program were the PSID, MINISID, and the GSID which was a ground emplaced version of the ADSID weighing only 6 pounds. These devices were fielded in Vietnam during the first half of 1969.

(S) The PSID with its self contained monitoring receiver provided a unique device for patrol operations. The PORTATALE monitor/receivers replaced the MICROTALE equipment. Other monitoring equipment such as the X-T plotter were introduced to provide visual history records of sensor activations in a 30 sensor field for each device.

(S) As operations expanded sensor applications were not limited to line-of-sight situations as was necessary with the original equipment. Relay equipments such as the GRP, and the ARP were introduced. The DART (Deployable Automatic Relay Terminal) system, utilizing an airborne platform (EC-121) with multiple monitors was also developed and used in the early months of 1969.

(S) Another major innovation introduced in Vietnam in October 1969 was the Battle Area Surveillance System (BASS) which was first fielded with the 25 Infantry Division. In this system sensors emplaced by various units can be read out directly by use of the VHF Portatale equipment. However, all sensor activations can also be received by a mountain top relay station and then broadcast at UHF. Higher echelon units, which do not have line-of-sight with the deployed sensors, can also monitor the activations with additional Portatale units provided they are equipped with suitable UHF/VHF "front end" converters. This way the system extends the range and operational flexibility of the local monitoring sites and, in addition, provides for selective monitoring by higher echelon over a wide geographical area.

Additional features of the BASS system were

- transmission of commands for Phase III sensors
- integration with the LORAN-C position location system
- digital burst message transmission.

(S) The system was deployed by the 25th Infantry Division with the relay located at the Nui Ba Den Mountain since this land feature provided coverage for a large part of the surrounding flat terrain.

(S) Thus we have seen that ground applications in South Vietnam between April 1968 and October 1969 have ranged from completely self contained systems such as the PSID to wide area large relay systems such as BASS. What was started by General Westmoreland as a limited sensor utility evaluation program by the fall of 1968 had turned into a "sensor fever."[51]

6 FORWARD AIR CONTROL (FAC) OPERATIONS

6.1 BACKGROUND

(U) Forward Air Control operations were not new to the war in Southeast Asia. The genesis is generally established during World War II. Forward Air Controllers were used extensively during the war in Korea. However, prior to the war in Vietnam, the Forward Air Controller was looked upon as primarily responsible for remaining on the ground and advising the ground commander in the use of tactical air for close air support. In Vietnam, the Forward Air Controller was used both as a ground based and an airborne observer. His airborne role became predominant in supporting allied air strikes out-of-country, i.e., against interdiction targets in North Vietnam and in Laos.[60,61]

(S) During the war in Vietnam the airborne Forward Air Controller became the eyes and ears for both air and ground operations. He became almost indispensable for both close air support operations and interdiction activities. His unique capabilities for intelligence gathering, target location, target identification, artillery fire and air strike direction (target designation), and battle damage assessments were quickly recognized and effectively exploited. In addition, the Forward Air Controller was extremely valuable during combined operations for rescue of downed aircrew members. In fact, for many cases the FAC assumed responsibility as the Search and Rescue on-site director until such time as he could be relieved by an appropriate Task Force command and control authority, such as the ABCCC aircraft. As an additional responsibility, the FAC was generally depended upon as the expert in prescribed Rules of Engagement. He was especially suited for this purpose because of his normally intimate knowledge concerning his specific geographical area of operations.[59,69]

6.2 FAC AIRCRAFT

(C) Types of FAC aircraft utilized in Vietnam and Laos may be divided into three categories: Propeller-driven Slow Movers (O-1, O-2, A-1 and OV-10); Jet or Fast Movers (F-100 and F-4); and Large FACs (C-123 and C-130).[61,63] Basic characteristics of each are provided below.

O-1 — The E model of the O-1 was used for FAC operations. A Cessna-built single engine, two seat, prop-driven light observation aircraft which was used extensively for low altitude operations in areas of low threat.

O-2 — The O-2 was a military version of the Cessna Model 337 Super Skymaster. Powered by twin turbo prop engines, it had an airspeed of around 200 knots, an altitude capability above 20K feet, and a range of 1100-1300 NM. Stores included flares, rockets, or other light ordnance carried on four underwing pylons.[69]

A-1E—The A-1E was the USAF designation of the Navy AD Douglas Skyraider propeller-driven fighter bomber. A 200 mph single seat aircraft used both in FAC and close air support operations.

OV-10—A replacement for the O-2, the OV-10 (Bronco) was a Light Armed Reconnaissance aircraft powered by two 700 shp turbo prop engines. Carrying a crew of two, it had a radius of 198 NM. There were provisions for additional reconnaissance equipment, such as doppler radar and TV capability.[59]

F-100—The North American Super Sabre jet fighter bomber which was employed in jet FAC operations is nick-named MISTY FAC.[62]

F-4— The McDonnell Douglas Phantom, an all-weather attack fighter. The F-4C, converted to the RF-4C became a multi-sensor reconnaissance version with accommodations for radar and photo systems, SLAR and IR. The F-4C was used in a dual FAC/STRIKE role and was known as the WOLF FAC.[62]

C-123—A Fairchild twin engine tactical transport aircraft augmented by two pylon mounted auxiliary turbo jet engines. With a payload of 15,000 lb. and a speed of 150-200 knots, this aircraft was used in a FAC role, primarily at night and served a very useful purpose for target location and illumination.

C-130—The AC-130 was a conversion of the C-130 military transport. A four engine turbo prop aircraft, used primarily in a GUNSHIP role, was equipped with its own guns, a searchlight and various sensors—including FLIR and Image Intensifiers.[62]

6.3 AUXILIARY EQUIPMENT [59,69]

(S) Auxiliary equipment used in Forward Air Controller operations included:

1. Binoculars - for daylight search and image (target) enhancement and magnification.
2. Night Observation Devices - for light intensification and image enhancement during reduced visibility and darkness a a Starlight Scope was used.[66]
3. Illumination - target illumination was accomplished at night using flares or searchlights. The C-123 was generally considered a flare ship or "Lamplighter." The AC-130, as a FAC, used a 2 KW illuminator searchlight to assist fighter aircraft in detecting targets. In the spotlight mode it was used to pinpoint the target while the aircraft was in its firing orbit.
4. Smoke Bombs - smoke was used to mark target areas for daytime strikes.
5. White Phosphorous - rockets used for target marking.
6. Loran - used for aircraft location, target location, and laser designation from a standoff position.
7. Photographic - handheld black and white cameras were generally used by slow moving FACs. The jet FACs occasionally emplaced their strike cameras in an intelligence role.
8. Laser Designators - for laser illumination of targets and use of laser guided bombs by strike aircraft.
9. Airborne Personnel Detector (APD) - used for locating groups of infiltrators and bivouac areas.
10. Radar - Airborne radar with moving target indicator (MTI) capability was used for detection and location of trucks.

11. FLIR - Forward looking infrared sensors were used for target location.

(S) Items 8 thru 11 were used in limited numbers and in the later years of the conflict. The more sophisticated devices such as radar with MTI and FLIR were more experimental in nature, used in limited numbers, and primarily used as equipment on the AC-130 gunships which served as its own FAC after being directed into a lucrative target area.[59]

6.4 FAC OPERATIONS

(S) FAC operations were conducted 24 hours around the clock, weather permitting. Normally each FAC was assigned a specific geographical area of coverage. He became intimately familiar with the terrain, the road and trail networks within his area of operations, suspected locations of truck parks, storage points and other fixed locations, and the general modus operandi of the enemy. Methods of operation varied with the type of aircraft and the geographical area of operations, e.g., whether a prop or a jet FAC was used and whether the location was North Vietnam, South Vietnam or Laos. Mission responsibilities, however, remained essentially the same and consisted of: daylight visual reconnaissance and observation of enemy activities (including troops, trucks and rivercraft); uncovering or detecting enemy targets; marking targets; directing air strikes against marked targets; reporting battle damage assessments; and supporting rescue operations.[59]

(C) During daylight hours, FAC missions were generally four to five hours in duration. Target locations were reported in real time to the Tactical Air Center (TACC) or to the Airborne Command and Control Center (ABCCC). Strike aircraft would be dispatched to the area for attack. The FAC remained in visual contact with the target until arrival of the strike aircraft and radio contact was made. Upon mating of a strike aircraft with the FAC, the FAC would proceed to mark the target or the vicinity of the target with smoke or phosphorous. After initial attack by the strike aircraft, the FAC would remain to assist with precise adjustment instructions for target location with respect to the original marker and/or the location of the first strike ordinance impact. In event of a successful hit on target, the FAC would attempt to observe bomb damage which he would report directly to the strike aircraft, the TACC or ABCCC and subsequently during his debrief after mission completion. Conditions permitting, the FAC took handheld black and white pictures of the target area, sometimes both, before and after the strike. One of the great values of daylight FAC operations came from the near real time local intelligence gathered on recent enemy movements, weather in the target area, conditions of roads and trails, and the results of most recent interdiction strikes. Photography taken by the FAC was generally available for review earlier than any other reconnaissance photography.[69]

(S) Visual observations at night were more difficult, however, often trucks drove the roads with lights on. When a convoy of trucks was detected, the night FAC would call for strike aircraft and upon their arrival, illuminate the area with flares and then stand off and assist in strike operations. Location of antiaircraft fire at night by FACs also greatly assisted in pinpointing defensive gun locations and even directing strikes against them for defense suppression.[59]

(S) As the threat from antiaircraft fire became more intense, many areas became non-permissive to slow moving FACs. F-100's (MISTY FAC) and F-4's (WOLF FAC) were used increasingly for FAC operations. Methods of operations changed somewhat—specifically in the mission times, which became around 90 mins in duration, and the altitude of flight. Some other problems were encountered which are reported in a subsequent section below. After the bombing halt in North Vietnam and the dedication of large numbers of tactical strike aircraft to the interdiction campaign in the Laotian Panhandle, FAC operations were swamped and could not accommodate all requirements.[57] Consequently, many strike aircraft were authorized to "self FAC" and all MISTY and WOLF pilots were FAC trained and the sorties given a dual mission.[62]

6.4.1 The FAC as Intelligence Collector

(S) For tactical intelligence collection, FAC operations must be considered highly successful. This is not to suggest that the FAC was capable of providing all intelligence needs for combat or interdiction planning and operations since many other sources were required in order to analyze and develop enemy targets for planned campaigns. However, there were certain elements of high value which the FAC did satisfactorily provide. They include:[59,69]

a. Near real time reports on enemy activities.

b. Continuing surveillance and observation of geographical features, such as roads, fords, trails, choke points and passes.

c. Almost real time photo coverage of areas of interest and battle damage resulting from target strikes.

d. Precise location of visible fixed target areas.

e. Target following and positioning for subsequent strikes.

f. Locating downed aircrew members.

g. Confirming unattended ground sensor derived targets.

h. Precise location of enemy AAA defense locations.

i. Accurate visual bomb damage assessment.

6.4.2 Problems of FAC Operations

(S) Some of the problems encountered with FAC operations in Southeast Asia were:

1. Up to 1968, limited or no capability existed for enhancement of visual observation capabilities other than the use of binoculars.[69]

2. Early handheld starlight scopes were difficult to manipulate and employ.[69]

3. Cockpit glare on the windshield at night required the O-2 crew to open the window for effective starlight scope use.[60]

4. Slow moving FACs were especially vulnerable to AAA and small arms fire.[60,61]

5. Because of the terrain and vegetation, it was often difficult to accurately mark targets.[69]
6. Although reasonable BDA could be acquired during daylight, either visually or with photo, BDA was especially difficult to obtain during darkness.[69]
7. The O-2 FAC aircraft was especially noisy and would often "sound" alert the enemy before the FAC arrived near enough for visual reconnaissance and target location.[69]
8. FACs often became frustrated with the enemy capability to seek cover and disappear into the jungle prior to the arrival of a strike aircraft.[69]
9. The OV-10 which replaced the O-2's had a limited night operation capability for visual reconnaissance. The canopy could not be opened and the handheld starlight scope was ineffective due to cockpit glare on the windows.[60,63]
10. Maps used by the jet FACs were not of adequate scale for accurate positioning and target reporting. The maps generally provided had a scale of 1:250,000.[69]
11. The F-100 MISTYs had difficulties spotting targets at night due to speeds of flight.[69]
12. Some of the sensors employed, such as SLAR and FLIR, were not considered completely reliable in that they had a high false target rate and the results were often difficult to interpret.[59]
13. Personnel turnover of about 25% per quarter impacted upon the efficiency of FAC operations.[62]
14. After the bombing halt in NVN, FACs were inadequate in number to support all the strike aircraft which were made available.[62]

6.5 SUMMARY

(S) Despite the problems encountered in FAC operations, they contributed heavily and effectively to the conduct of warfare in Southeast Asia. The FAC was a necessary adjunct to interdiction operations and especially to air interdiction. The FAC mission responsibilities were expanded from visual real time reconnaissance during daylight hours in close air support and air interdiction to an ultimate role of Strike Control and Reconnaissance (SCAR) as an extension of the Tactical Air Control (TAC) System.[60] Sophisticated surveillance and target location equipment was developed and provided for target location and target designation.[64] Some FAC operations, e.g., F-4 and C-130 were developed into a dual FAC/STRIKE role. Some examples of dependency upon FAC operations are: of 555 total strike sorties flown in November 1968 by the 8th Tactical Fighter Wing, 285 were flown under night FAC control, and in December 1968, of 566 sorties, 298 were under FAC control. Most of the other strikes were accomplished during bad weather and under Combat Sky Spot (Radar vectored) control;[62] convoy FACs were depended upon to obtain target validations under the established Rules of Engagement; most jet strikes against moving targets, such as trucks at night, could only be effective with FAC marking, illumination and/or strike direction;[67] FACs provided the major support for laser target designation in support of laser guided bombing against fixed targets;[60] strike aircraft depended upon FACs to advise them of air defense positions intensity of fire and to direct them in fire suppression against antiaircraft sites; tactical air strike crews depended heavily upon FAC operations for validation of bomb damage; strike crews and other FAC crews depended heavily upon after mission FAC reports for the most current intelligence concerning target areas for lucrative interdiction;[69] FACs were used for target validation of unattended ground sensor reported targets.[64,68,66]

(S) It was also discovered that large aircraft and jet aircraft could operate effectively in the forward air control role.[60,61] Significantly, the jet FACs generally reported equal or better BDA per sortie than the slower moving FACs. The jet FAC could operate with greater immunity over heavily defended areas because of the minimum time over the area due to speed, yet at his altitude he could visually cover more area for bomb damage assessment.[61] The jet FAC also often had the capability to accomplish his own defense suppression. The large FACs (C-123 and C-130) also had an advantage over the small slow movers, and could visually observe a greater expanse of the area. This is no doubt contributable to more crew members, therefore, more eyes and a more effective use of binoculars and night observation devices (NODs).[61]

(C) In sum, as an intelligence collector, the FAC provided real time intelligence, including photography and sensor data, and vital information concerning terrain, enemy force locations, enemy movements, AAA locations, target identification and description, and battle damage. FAC intelligence debriefing reports were highly valued by all combat personnel and constituted an important portion of the intelligence base used by tactical unit intelligence officers.

7 HUMINT

(C) The human intelligence (HUMINT) means employed in tactical intelligence collection in Southeast Asia were essentially reconnaissance patrols of various types, shallow and deep penetration agents, interrogations of prisoners and ralliers, visual aerial reconnaissance, document translations, and, of course, non-combatant civilians whose loyalty to the GVN motivated them to volunteer information about the enemy to ARVN, US and other allied forces. To these collection means may be added forces in contact with the enemy. Properly speaking, the latter should not be grouped with the others whose assignments or missions were only to reconnoiter or collect intelligence. However, in the Vietnam environment where the principal problem was to locate the enemy, reports from ground combat units which managed to establish contact with the enemy were prime sources of tactical intelligence because they confirmed an enemy presence at a specific place. In that sense they supplied better than any other source a definitive answer to the question "where is the enemy?"

7.1 GROUND RECONNAISSANCE PATROLS

(U) One of the most effective means of acquiring tactical intelligence on where the enemy was (or was not) present in strength was the ground reconnaissance patrol. All combat units at all times reconnoitered their immediate areas as a defensive precaution against an enemy buildup for an attack. These close-in patrols, however, shed little light on what the enemy was doing in more remote locations. A variety of specially tailored formations was employed to meet this need.

7.1.1 Long Range Reconnaissance Patrols

(S) In September 1966 in an effort to improve the tactical intelligence collection capabilities of US combat units, MACV devised and implemented the Long Range Reconnaissance Patrol (LRRP) concept. Originally called RECONDO (for Reconnaissance Doughboys) the LRRP was an adaptation of the deep-penetration Special Forces patrol to the requirements of tactical commanders. A RECONDO school and training program were established at Dong Ba Thin, south of Nha Trang (the headquarters location of the

5th SFG (Abn)), and all US Army combat elements were tasked to assign qualified individuals to the school for three weeks of training by Special Forces instructors in the methods and techniques of deep-penetration patroling. Upon return to their parent units these personnel were formed up into LRRP platoons and companies.

(C) LRRPs were divisional assets and in normal practice they were assigned to the division G-2 (or S-2 in the cases of separate brigades), who usually allocated one platoon to each of the division's brigades. LRRPs were inserted into areas chosen by division or brigade, and reconnoitered them according to a planned pattern. Often these areas were candidate locations for future operations. The LRRPs were especially tasked to reconnoiter possible LZs for signs of enemy defenses. The LRRP mission was only to gather intelligence. They made every effort to avoid contact because their small size (5-6 men) and light weaponry gave them only minimum fire-power protection.

(C) LRRPs usually did not operate beyond the range of protective friendly artillery. When they did, it was necessary to dedicate gunship support to them to enhance their chances of survival against the enemy in an unavoidable encounter. When LRRPs operated at extended ranges it was usually to perform assessments of damage inflicted by heavy bombing raids conducted at the request of the division. Targeting procedures required that B-52 raids flown in response to tactical unit requests would be assessed on the ground by the requesting organization.

(C) LRRPs enjoyed mixed success. Both documentary evidence (After Action and Operational Reports) and interviews conducted in support of this study indicate that they were only sometimes useful.[70] Reasons appear to be associated with their relatively shallow range; i.e., the enemy tended to maneuver beyond and between friendly artillery fire fans as much as possible. However, there is no direct evidence to support this conclusion. In the later stages of the war LRRP assets were converted to Ranger patrols which operated in conjunction with Air Cavalry as extended-range combat patrols.[71] In this mode they responded to G-3 rather than to G-2 direction. Tactical commanders tend to assess the combat method of patroling as being more effective than the LRRP method because it increased the chances of developing opportunistic contacts into decisive engagements.[72]

7.1.2 Special Operations

(S) Special operations intelligence gathering patrols were conducted by highly trained and specialized US and allied personnel. They were commanded and controlled at or above Field Force level.[73] The level of command and control varied with specific missions and the areas in which they were performed. The most sensitive border and cross-border reconnaissance missions were controlled directly by MACV through the Studies and Observations Group (SOG) which was the successor organization to the Combined Studies Division (CSD) of the 1960-63 period.[74]

(S) Access to the results of special operations missions was most highly restricted to key officials in Saigon and Washington. The intelligence acquired was often used in the planning and post-strike assessments of B-52 raids on enemy bases in out-of-country sanctuaries.[75] Other, somewhat less-sensitive reconnaissance missions within South Vietnam but in remote jungle locations suspected of harboring enemy units and installations were controlled by Field Force (including III Marine Amphibious Force-III MAF) commanders on order of COMUSMACV. Irrespective of the level of command, the same assets were employed in the same way, including tasking of US divisions for helicopter lift and gunship support as necessary.[76]

(S) Delta, Sigma and Omega. Special operations ground reconnaissance patrols were performed by assets assigned to the 5th SFG (Abn) for command and administration but operationally controlled by MACSOG.*

*MACSOG was a joint and combined organization. Its operating doctrine was consistent with published JCS and Service guidance on Unconventional Warfare. This section addresses only the ground reconnaissance aspects of its operations. As US redeployments progressed after 1970, OPCON of missions within South Vietnam was occasionally passed to US divisions.

The ground reconnaissance assets were organized into detachments named Delta, Sigma and Omega. Patrols consisted of 4-6 men. The standard mix was four highly trained Montagnard, Cambodian or northern minority group personnel, one Vietnamese Special Forces, and one US Army Special Forces. Other allied Special Action Services personnel also participated in the combined operations program.

(S) Individual special operations patrols reconnoitered an area averaging 2 x 10 km for up to five days. In normal practice numerous patrols were committed simultaneously within a broad zone (up to 50 x 30 km) that was subdivided into the smaller individual patrol reconnaissance zones. Patrol routes were devised in advance to ensure maximum coverage of the area selected for scrutiny.[77] A reaction force of three or more companies of equally highly trained irregulars, together with supporting airlift and gunships, was held in reserve for commitment against the enemy when a deep penetration patrol encountered serious difficulty.[78]

(S) Road Runner, Road Watch and River Watch. As the war progressed and as the enemy consolidated his positions in the Laotian panhandle and eastern Cambodia, it became progressively more difficult for MACSOG teams to perform reconnaissance in those and adjacent border areas of Vietnam without being detected. Although the teams often wore clothing (e.g., "black pajamas") appropriate to the environment, there was no effective way to disguise non-oriental team members. For some operations, therefore, only individuals with ethnic characteristics in keeping with the area were inserted for reconnaissance and intelligence purposes, i.e., Lao, Montagnard and Cambodian. Road watch and river watch teams were inserted into the denied areas from a variety of sites in friendly territory. In Laos the teams were often supported from other than MACSOG resources.

(S) The missions of road runner, road watch and river watch teams were only to observe and report on enemy movement and activities along the trails and waterways which provided access to South Vietnam. It is an unfortunate truth that their reports were often assigned low credibility ratings at higher command levels because of what was believed to be the improbability of their content. This was esp ally true of early reports on the movement of NVA tanks on the trails i. Laos. The reports were routinely dismissed as emanating from unreliable sources and having improbable content until the enemy attack on Lang Vei, to which CIDG forces at Khe Sanh had displaced in 1966 when III MAF elected to strengthen the Khe Sanh position. Lang Vei was overrun in February 1968 by NVA forces employing armored infantry tactics. This attack initiated the siege of Khe Sanh itself.

(S) Effectiveness. It is most difficult to validate the effectiveness of Special Operations reconnaissance patrols because knowledge of their activities as well as reports concerning them were so tightly restricted. Such patrols were, however, prime sources of intelligence for the planning of B-52 strikes and for post-strike bomb damage assessments. In addition, they provided essential intelligence inputs for estimates of the rate and directions of flow of men and materiel from North Vietnam into the south. Field Force, including III MAF commanders who had access to special operations patrol reports pertinent to their immediate needs, found them only sometimes useful. Senior US commanders knowledgeable of MACSOG operations have also questioned whether the results were worth the costs. Field Force and, upon occasion, Division commanders were routinely tasked for support to SOG operations. Division commanders never received readouts of the results and Field Force commanders received them only under certain conditions. It is understandable why, under these circumstances, there is serious questioning of the usefulness of the results in relation to resource expenditures.

7.1.3 CIDG

(C) Another widely-used source of tactical intelligence was reports from Civilian Irregular Defense Groups (CIDG) Camps. From 1961 onward these camps had been developed in locations along the western border of Vietnam from the DMZ to the Gulf of Thailand. Camps were also sited in a number of interior locations astride natural lines of surface movement to the heavily populated rice-growing parts of South Vietnam. All camps were lightly fortified posts manned by civilian irregulars who were commanded by Vietnamese Special Forces with advice and assistance from US Army Special Forces.

(C) Each CIDG camp had a complement of three or more companies of "Strike Forces" who patrolled day and night along the trails and waterways in their area. Collectively, the camps provided a light, intelligenc and reconnaissance screen for MACV and the Vietnamese JGS along the western and especially the highland border, and the approaches to the coastal lowlands. The CIDG had the advantage of being native to the areas of their operations and they willingly sought to defend their homelands against North Vietnamese encroachment. Evidence of their effectiveness in blocking enemy infiltration is easily seen in the list of major actions in Vietnam. Con Thien, Khe Sanh, A Shaw, Dak To, Kham Duc, Ben Het, Duc Co, Plei Me, Ban Don, Bu Dop, Prek Klok, Katum and many others were battles which the enemy initiated in an attempt to knock out a CIDG camp impeding his way to the population centers of South Vietnam.

(U) Tactical intelligence reports from CIDG patrols were excellent sources of data for US and other allied conventional forces when planning or conducting operations in remote border and interior locations. Toward the end of the war and as part of the Vietnamization program, the CIDG were converted to Border Ranger forces. Their functions of providing a light reconnaissance and intelligence screen along the approaches to the coastal lowlands remained unchanged.

(S) Echelon of Control. The problem of echelon of control for Special Operations patrols, including CIDG, was never satisfactorily resolved during the period of US involvement in combat in Southeast Asia. Control never passed below Field Force level for MACSOG operations even though divisions were tasked for support when operations were initiated from within their TAOIs. CIDG forces were occasionally placed under the control of US tactical commanders for specific operations but procedures were awkward and cumbersome owing to the fact that the forces were properly Vietnamese assets not subject to unilateral direction through US command channels. Some US tactical commanders had difficulty in appreciating this fact.[79]

(S) For cross-border intelligence gathering, control of MACSOG operations was exercised directly from the highest levels in Washington and Saigon. A principal reason for this apart from the political and security issues involved in the collection of intelligence in Laos, Cambodia and North Vietnam, was State Department and other US civilian intelligence agency concern with their prerogatives within geographical limits depicted on US maps which the enemy chose to ignore. Control from the highest national authority in Washington was required to overcome objections from senior US officials in Southeast Asia who were outside the MACV command and control chain.

(S) Even when they operated entirely within South Vietnam, Special Operations tactical intelligence gathering assets were contested for by different US command and staff elements. The ground reconnaissance assets were buried within the combined USASF/VNSF command structure and were dispersed country-wide. These assets included highly-prized capabilities which enabled MACV, Field Force and division commanders to "see" into the recesses of the enemy's sanctuaries, War Zones and secret bases. The overriding and unresolved issue was always whether MACV J-2, Field Forces or MACSOG should have direct control of the assets involved, including especially the setting of mission priorities for in-country operations. The joint and combined nature of the special operations organization militated passing operational control of the assets to the lower, tactical echelons of the US force structure. Tactical commanders who had no need to know about the total capability and command organization of the specialized assets were, however, unable to appreciate the reasons.

7.1.4 Provincial Reconnaissance Units

(C) Provincial Reconnaissance Units (PRUs) were special intelligence collection assets of the Vietnamese Province Chiefs. They were highly-trained in deep-penetration patroling and clandestine intelligence techniques. The missions of the PRU were to collect tactical intelligence from within the enemy's War Zones and secret base areas, and to identify and neutralize the VCI. The results of PRU operations were usually available to US tactical commanders, through the PIOCC/DIOCC system. The usefulness of PRU collection efforts tended to vary with the effectiveness of their employment by individual Province Chiefs. As PRU capabilities were more directly focused on the VCI from 1967 onward (under the Phoenix program) their collection of tactical intelligence of immediate value to US maneuver units tended to decline.

7.2 AGENTS

(S) Agents were a major source of tactical intelligence for US, ARVN and other FWMAF. They were employed in-country and cross-border through a variety of nets that defied efforts to administer and control. MACV J-2's attempts to establish a central source registry for agent control by CICV were only partially successful simply because of the magnitude of the effort. District Chiefs, Province Chiefs, Police Special Branch, ARVN Units, the Vietnamese Military Security Service (MSS), CIDG camps, US and other FWMAF units, and numerous other organizations were all involved in the operation of agent nets. The 525th MI Group alone had 1325 agents in its employ country-wide in 1971.[80]

(S) Some agent nets were unilaterally operated—by the US, by the Vietnamese and by others. Other nets were bilaterally operated by the US and Vietnamese. On the Vietnamese side alone, ARVN, the Police and the Province and District chiefs ran both unilateral and cooperative nets. No one will ever know how many times a single agent was paid for the same information as he provided it to his various handlers. Nor will it ever be known how many times reports on enemy activities were "confirmed" at higher levels because the intelligence appeared to originate with different sources when in reality it did not.

(C) Agent reports were generally regarded by tactical commanders as one of their most useful sources of intelligence.[81] Especially useful were reports voluntarily offered by Vietnamese citizens to US units. Such reports and the frequency with which they were volunteered were regarded as a key indicator of success in providing security to the inhabitants of hamlets and villages which were subject to terroristic and other harassment by the enemy. In Main Force operations, US tactical units seldom remained in one area long enough to engender trust and confidence in the local population where one existed. (It was a characteristic of Main Force operations that they were conducted in relatively remote and unpopulated areas.) When a US tactical unit did remain for as long as three months in a heavily settled district, sufficient confidence was developed in the people to prompt them to volunteer large quantities of information about the enemy.[82]

7.3 PRISONER AND RALLIER INTERROGATIONS

(C) Interrogations of captured enemy personnel and of ralliers (Hoi Chans) who defected to the government side under the Chieu Hoi (Open Arms) program were additional primary sources of tactical intelligence. Prisoners and ralliers were often exploited at battalion or brigade levels, and then at Division before passing into CICV channels for more extensive interrogation at national and regional centers. Division IPW sections often held prisoners and ralliers for up to a week in violation of CICV directives to evacuate them to regional centers within three days.

(C) Upon occasion a battlefield interrogation produced intelligence of immediate relevance to the tactical situation.[83] In equally often circumstances, however, the information which the prisoners and ralliers could provide was usually dated and had little immediate tactical value. Interrogations of prisoners and ralliers by Combined Military Interrogation Center (CMIC) personnel nonetheless produced substantial amounts of intelligence useful in developing long-term analyses of enemy operational patterns.[84] Moreover, detailed interrogations and subsequent analyses by CICV personnel frequently led to the planning and execution of operations by US and ARVN against enemy units and hidden bases.[85] During the period November 1970 - April 1971, for example, 25 successful operations were mounted against enemy units and bases in response to intelligence developed through CICV channels.[86]

7.4 CAPTURED DOCUMENT EXPLOITATION

(C) Translations of captured enemy documents were another valuable source of tactical intelligence. Enemy operational orders and plans were, of course, highly perishable items and few capturing US units had any capability whatsoever to exploit them for immediate tactical advantage. At best, they were given a cursory review on-the-spot by an interpreter/translator who attempted to isolate items of direct and immediate use. In some instances this worked well but in others the sheer volume of documents captured (hundreds of pounds at a time in War Zone C operations) precluded use of this approach.[87] Documents were usually evacuated to CICV Captured Document Exploitation Centers (CDEC) for screening and translation. An appreciation for the magnitude of the effort involved can be gained from a glance at the results of only one six month period. From November 1970 to April 1971, CDEC received and processed over 1,000,000 pages of documents. Of this number, 124,000 were found to have intelligence value and were translated and summarized for tactical units. In addition, CDEC prepared more than 1200 IIRs based on the exploited material.[88]

7.5 OTHER HUMINT

(C) Other indigenous HUMINT sources of tactical intelligence were especially useful to pacification operations. These included mainly the US-sponsored Revolutionary Development (RD) Cadres and Census Grievance teams which worked for Province and District Chiefs. US access to intelligence acquired by these teams was through the PIOCC/DIOCC system. RD Cadres and Census Grievance teams had direct, daily contact with the Vietnamese citizenry at the lowest hamlet and village levels. Tactical intelligence from these sources varied in timeliness with the recentness of its acquisition by the people who volunteered it, and also with the time required to process it through the appropriate DIOCC and PIOCC and into the hands of US tactical commanders. Regardless of the time required the intelligence was almost always useful.[89] In optimum cases it was exploited for immediate tactical purposes. Even when the intelligence was dated it nonetheless provided additional material fo the ongoing process of pattern analysis.

7.6 VISUAL AERIAL RECONNAISSANCE

7.6.1 Air Cavalry Patrols

(C) Documentation on the operational activities of US Army combat units in Vietnam is replete with favorable comments on the effectiveness of Air Cavalry reconnaissance patrols in locating enemy units. Interviews with tactical unit commanders have uniformly verified these reports, and indeed, have elicited the additional information that hand-held cameras employed by Air Cavalry personnel were a most useful and timely source of aerial photographic coverage of tactical unit areas of operations. In the case of operations in War Zone C, for example, the G-2 section of the 25th Infantry Division made frequent use of photographs taken from Air Cavalry and Division aviation aircraft (OH-6A, AH-1G, UH-1D, O-1) in 1967, 1968 and 1969 to develop targets for future operations.[90] Division and separate brigade commanders and staffs clearly tended to prefer the hand-held camera over photographic coverage provided on request by either the USAF or non-divisional Army Aviation because it was more timely and more immediately responsive to their needs.[91]

(C) Air Cavalry reconnaissance capabilities were in great demand and short supply in Vietnam. Most commanders desired at least one troop per brigade but the norm, apart from the airmobile divisions, was two troops per division. The assets involved were controlled by the G-2 (or at least by the combined G-2/G-3 TOC) and were employed day and night in visual reconnaissance and LRRP operations. Air Cavalry personnel shared with FACs the advantage of developing such detailed familiarity with an area of operations that they were quick to notice changes in the landscape—i.e., a previously unused trail showing evidence of use, structures and garden plots appearing where none had been earlier. Visible changes of this sort were always worth further scrutiny. Photography, reconnaissance on the ground by a LRRP or, often, a deliberate attempt to draw fire were among the techniques used. Former brigade and division commanders unanimously value Air Cavalry patrols as their best (and most timely) source of tactical intelligence.[92]

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Rick Hohman
Director
Security and Intelligence Directorate

cc:
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